ONE OCEAN FOUNDATION

BUSINESS FOR OCEAN SUSTAINABILITY

SECOND EDITION – A GLOBAL PERSPECTIVE

SDA Bocconi School of Management | Sustainability Lab

McKinsey & Company

CSIC

ABOUT BUSINESS FOR OCEAN SUSTAINABILITY

Business for Ocean Sustainability is a multi-year research project developed by the One Ocean Foundation (OOF) in collaboration with SDA Bocconi School of Management, McKinsey & Company and the CSIC (Consejo Superior de Investigaciones Científicas).

In 2019, the first edition of the report Business for Ocean Sustainability - Focus on the Mediterranean Sea was published and presented at the World Ocean Summit in Paris. The document can be downloaded at www.1ocean.org/

This second edition of the report, entitled Business for Ocean Sustainability - A Global Perspective, is especially important as it broadens the scope of the study to the global community, widening the OOF's perimeter of action. This year, the report was presented at the United Nations World Oceans Day event on June 8, 2020.

The aim of this project is to analyze the pressures exerted by business on the marine ecosystem. This study examines the existing relationships between ocean sustainability and the economy from new perspectives. In particular, we focus on companies' awareness, strategies and innovative practices, investigating not only the direct pressures generated by industrial and consumption activities, but also the indirect pressures on marine and coastal ecosystems, thus extending the boundaries of the analysis. Furthermore, the research adopts a supply chain perspective and provides a review of relevant innovations and best practices at different stages of production and consumption, from raw materials to end of life.

The One Ocean Foundation intends to continue this commitment in the coming years, to become a pioneer in the area of research which examines the relationships between business and ocean sustainability, and to provide innovative solutions for companies and policy makers.

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Photo by Kurt Arrigo

FOREWORD

Our human footprint is threatening the health of the oceans and the world's seas. Scientific reports provide evidence that marine ecosystems are rapidly losing resilience as a result of acidification and ocean warming, marine debris and plastics, chemical pollution, eutrophication processes, loss of biodiversity and the overconsumption of aquatic resources. Worldwide news tells us of coral bleaching, rising sea levels, and declines in the population of ocean species. We are witnessing an unprecedented crisis and without global and local action our blue planet is at risk.

More than two years ago, we started our journey with the mission of accelerating solutions to ocean issues by inspiring leaders, promoting a sustainable ocean economy and enhancing ocean knowledge through ocean literacy. First we organized an international conference held in Milan, which also included the launch of the Charta Smeralda, the ethical code of conduct aimed at raising awareness among individuals, businesses, stakeholders and communities, on the urgency of addressing the problems related to the ocean.

The following year we released the first Business for Ocean Sustainability study, focused on the Mediterranean Sea, investigating the attitude of the business world towards the ocean, and beginning to identify the most urgent responses to the many issues. We are now at the third stage of this journey. With our partners, CSIC, McKinsey & Company and SDA Bocconi School of Management who have assisted us on this path, we have designed and carried out this new research project.

This report broadens the perspective of our analysis and contributes to better understanding global trends with regard to ocean-based sectors and other inland industries. Moreover, it helps to identity existing and emerging solutions to tackle the challenges we are facing. As we proceed on our journey, we have a growing understanding not only of the importance of our endeavor, but also the necessity of mobilizing the best resources, harnessing the momentum to contribute to establishing ocean sustainability as a mainstream theme among ocean professionals and sea-lovers, but also within the global business community and in society as a whole.

Albert Einstein once said: *"Whoever says something is impossible should not disturb those that are working on it"*

Here we share our findings, grounded in a thorough scientific approach, and we advance a novel proposal that we think should foster global responses in preventing human pressures on the seas and on life below water. A call to action to bring multiple stakeholders together around the idea of enhancing the disclosure of voluntary, material and reliable ocean-related business information. Furthermore, we propose the introduction of the first Ocean Disclosure Index as an opportunity for companies and investors to increase awareness, enable transparency and quantify risks at the nexus of business and the ocean.

Riccardo Bonadeo,
Vice President, One Ocean Foundation

EXECUTIVE SUMMARY

This second edition of Business for Ocean Sustainability - A Global Perspective, represents the continuation of the journey that the One Ocean Foundation set out on three years ago in order to build knowledge about what companies are doing to address the many challenges facing marine ecosystems. We have opened a new research avenue connecting the business world to the challenges of protecting the ocean, expanding the “narrow” focus of the so-called “blue” or “ocean” economy to incorporate all types of industries and sectors. Moreover, we have introduced a business perspective, investigating the level of awareness of companies with regard to their direct and indirect pressures on the ocean, and analyzing the responses developed to address these pressures, their diffusion and their effectiveness.

This new study draws on a large sample of 1,664 companies, accounting for 50% of the world’s market capitalization and distributed across 16 industrial sectors, both ocean and non-ocean related. The insights offer a snapshot of the main trends occurring at the global level with regard to business strategies and practices to respond to ocean sustainability challenges.

Over 3 billion people (40% of the world’s population) depend on the biodiversity and services offered by marine and coastal ecosystems. The ocean supports unique habitats, and the services provided by the ocean include food and fresh water supply, renewable energy, benefits for health and well-being, cultural value, tourism, trade and transport, making a major contribution to our economic and social development.

Ocean economy sectors (including established industries such as commercial fishing and fish processing, aquaculture, shipbuilding and repair, offshore oil and gas, port activities, maritime trade, and emerging sectors such as exploitation of renewable energy) account for estimated annual revenues of $5.2 trillion, gross value added (GVA) of $2.6 trillion, 2/3 of which are generated in the Atlantic and Pacific oceans, and employ 168 million people. The ocean contributes 3.3% of the overall global economy in terms of GVA, making it the seventh largest economy in the world. Preserving the health of marine and coastal ecosystems is paramount due to the many irreplaceable benefits provided by the ocean and the seas, in addition to the fact that a healthy marine environment is a “habitat” in which businesses can develop and thrive.

According to our findings, 51% of companies are aware, albeit to varying degrees, of the potential pressures of their industries on the ocean, and 44% of them deploy some kind of mitigating activities. The best recognized problems are marine litter (mostly plastic), biodiversity and contaminants; all of them primarily associated with ocean acidification. Awareness of pressures generated by less publicized issues, such as over-exploitation of marine resources, eutrophication, seafloor integrity and the introduction of energy in the marine environment (i.e. noise, heat, vibration, light) is still limited.

In order to reach ocean sustainability, awareness and activation must converge. Our findings confirm that awareness about ocean-related issues is not yet widespread in all sectors and among all companies. Of our sample, 49% show low awareness, and in 1/4 of the cases perception of the issues is not followed by coherent business responses. Addressing the major sustainability challenges identified requires both “unlocking” of awareness and activation from companies using adequate and coherent tools.

According to our analysis, 26% of companies are simultaneously aware and active. We call these companies sustainability leaders, and they can be found in most industries, both ocean and non-ocean related.

Sustainability leaders reveal a better attitude towards product innovation (e.g. in the form of eco-design, plastic reduction and introduction of new materials, development of more advanced Life Cycle Assessment techniques, or extension of product life cycles), process innovation (e.g. mainly related to GHG emission reduction and recycling initiatives), and collaboration and engagement of relevant stakeholders for ocean protection (e.g. multi-stakeholder partnerships, involving NGOs, the scientific community, peer companies or suppliers).

Sustainability leaders have reached greater maturity than other peers in their ESG (environmental, social and governance) sustainability journey, including in terms of development of more advanced solutions for managing the supply chain, and in the adoption of transparent reporting initiatives.

As companies strive to operate in a more responsible manner, sustainability practices along supply chains have become a business imperative. This report highlights various best practices in the field of procurement and design, operations and logistics, and waste management, aimed at providing evidence on how sustainable supply chain initiatives can trigger increased awareness and activation.

Finally, this study provides a detailed examination of accountability and disclosure practices. Among sustainability leaders, 91% report on their general sustainability agenda using the GRI (Global Reporting Initiative), the most widespread sustainability reporting standard. In any case, as of today, there is no specific reporting initiative focused on ocean-related issues, and companies willing to report on the ocean are forced to elaborate and adopt self-defined targets or indicators.

We believe that greater awareness and activation can be boosted through new and dedicated initiatives aimed at promoting the disclosure of data and information regarding business pressures on marine and coastal ecosystems. Just as in the case of climate change and the circular economy, the disclosure of standardized ocean-related information will be beneficial to business, investors, policy makers and other stakeholders. The OOF sees momentum for starting a new ambitious “enterprise”, bringing multiple stakeholders together around the idea of increasing the disclosure of voluntary, material and reliable ocean-related business information. The selection of a list of ocean sustainability leaders, demonstrating excellent environmental performance, will be focused on responding to investors’ needs, in order to underpin robust ESG analysis. The ultimate goal being the introduction of the Ocean Disclosure Index, based on the virtuous behavior of companies in managing and reporting their practices on ocean sustainability.

OBJECTIVES OF THE REPORT

This report represents the continuation of the journey undertaken with the first edition of Business for Ocean Sustainability - Focus on the Mediterranean Sea, published in 2019.

As with the previous edition, this report also aims to investigate what business is doing to address the many challenges related to ocean sustainability. It does so by analyzing the level of awareness of companies regarding the pressures[1] exerted on marine and coastal ecosystems, and investigating the responses developed to address these pressures.

In this report we also extend the traditional boundaries of analysis to include not only direct pressures from maritime industries, but also indirect ones determined by production and consumption activities occurring inland. We acknowledge that ocean sustainability emerges when both terrestrial and marine-based activities operate in balance with the long-term capacity of marine and coastal ecosystems to support them, while remaining resilient and healthy.

In addition, the current edition presents numerous novel in-depth areas of investigation.

1. **The scope of the research has been extended to a global perspective,** through the analysis of strategies and initiatives of an unprecedentedly broad sample of 1,664 companies in 16 sectors, accounting for 50% of the world's market capitalization. For this reason, the information and the data collected and elaborated, and the business practices analyzed, will help to better understand the main trends occurring at the global level with regard to ocean sustainability challenges.
2. **The science-based analysis of direct and indirect industrial pressures** on ocean health, using the EU Good Environmental Status descriptors as a reference framework, has been broadened, involving an even more international and multi-disciplinary panel of scholars and experts.
3. **The report provides a first overview of businesses' commitment to SDG 14 Life below water** compared to other SDGs. Moreover, we provide a snapshot of the level of attention among ocean economy companies to this specific SDG. In line with other studies on adoption by the business community of SDGs, we consider the inclusion of SDG 14 in corporate reports as a first indicator of the firm's specific attention to ocean-related issues. At the same time, we acknowledge

1 We consider "pressure" to be any action that makes a change to the state of the natural environment, whether adverse or beneficial, wholly or partially resulting from the activity of an organization, or the utilization of products or services". See in this regard Cooper P. (2013), Socio-ecological accounting: DPSWR, a modified DPSIR framework, and its application to marine ecosystems, Ecological Economics 94 (2013) 106–115

that this behavior is not conclusive to assessing a more profound organizational awareness, nor the activation of effective responses towards relevant direct and indirect marine challenges.

4. **The analysis of ocean-related awareness and the activation strategies and practices of global companies** was broadened, considering a more comprehensive set of variables. This approach was crucial to better capture the level of attention towards marine-related issues and to assess the development of coherent responses by corporate sustainability leaders, examining their profiles, strategies and main business practices.
5. **The analysis is complemented by an overview of sustainability practices along the entire supply chain,** with a review of the main innovative responses deployed by companies to mitigate their pressures on the ocean.
6. **Finally, the report focuses on the need for transparency and disclosure with regard to ocean issues.** The development of a new sustainability initiative dealing with these aspects could encourage businesses to respond in ways mitigating their direct and indirect pressures on the seas and on life below water.

Methodology

This report is based on data analyzed through quantitative and qualitative research methods. An extensive review was conducted to assess the annual economic value of the World Ocean from socioeconomic and ecological perspectives. This was done by gathering and elaborating information from multiple sources (academic publications, statistical data, government reports and practitioner-based literature). The availability and quality of data differs among regions and countries and our findings are based on a number of estimates and assumptions. The ocean economy sectors investigated include established ones (i.e. coastal tourism, commercial fishing, industrial aquaculture, shipbuilding and ship maintenance, offshore oil and gas extraction, port activities, shipping and maritime transport) and emerging sectors (i.e. exploitation of marine renewable energy, the use of marine biodiversity for medical-pharmaceutical purposes, desalination and seabed mining).

In order to identify the most significant direct and indirect pressures exerted by business activities – both ocean and non-ocean related ¬– on marine and coastal ecosystems, this report builds on existing institutional frameworks and scientific knowledge. The ocean pressures have been analyzed based on the 11 Good Environmental Status (GES) descriptors defined by the EU Marine Strategy Framework Directive. The evaluation of the direct and indirect pressures was assessed through a thorough scientific review. A panel of 56 natural and social scientists with different backgrounds (e.g. marine and socio-ecology, zoology, environmental sciences, marine biology) from leading research institutes and universities across Europe, North and South America and Australia was involved.

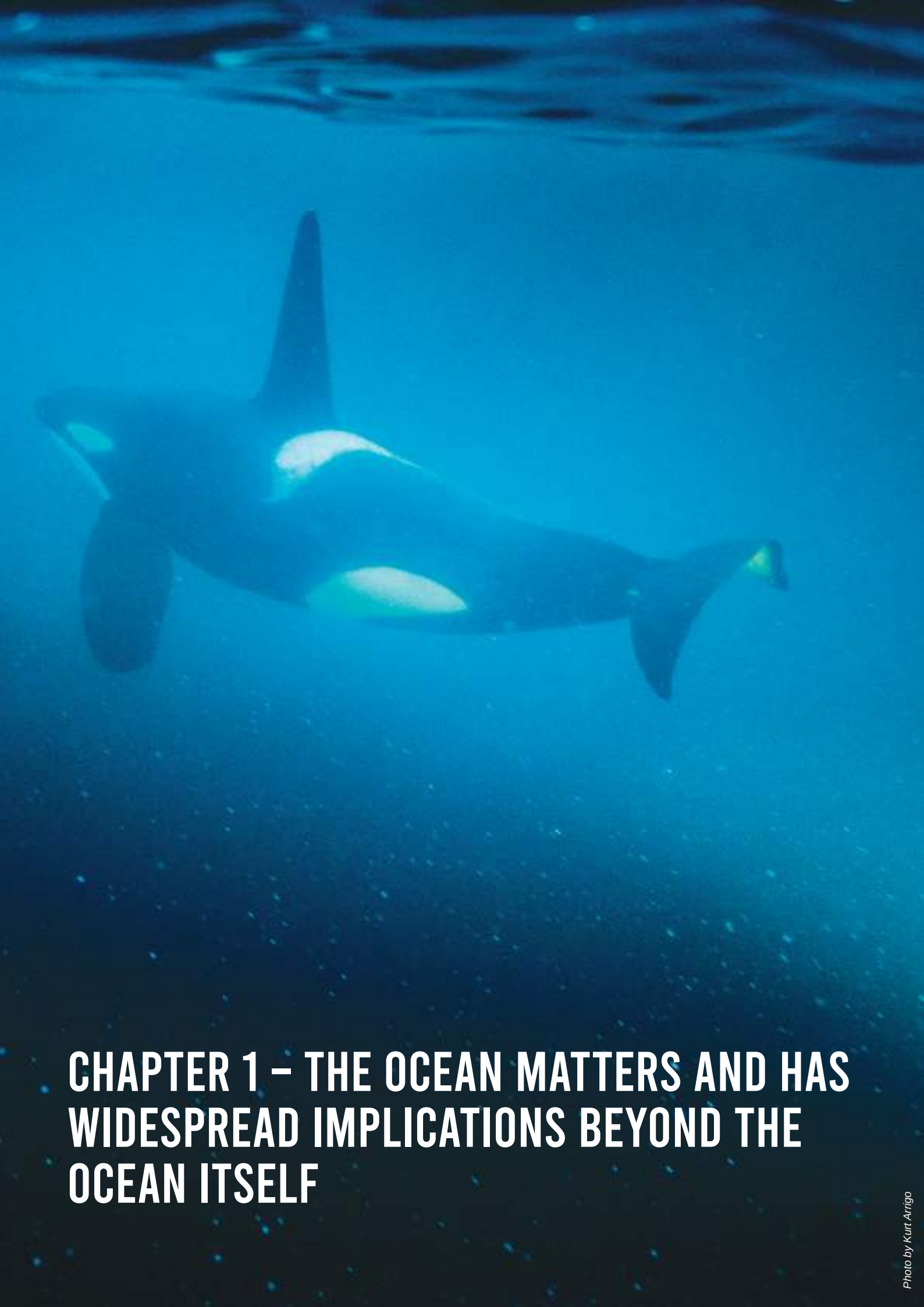
Natural Language Processing and lexicometry methodologies were adopted to analyze 1,664 public sustainability reports (including 69 sustainability reports by companies belonging to ocean economy sectors) from the world's largest corporations by market capitalization, from different industrial sectors and geographies. A combination of more than 200 keywords, reflecting companies' awareness and activation on marine environment, was selected through several rounds of expert consultation. Advanced lexicometry methodologies and ad-hoc scoring systems were used to extract and elaborate the data in order to map and analyze the extent of companies' awareness and the initiatives adopted to mitigate their pressures on marine ecosystems.

In terms of economic dimension, the sample represents companies with a total **market capitalization** of almost **$45 trillion**, accounting for **50%** of the world's market capitalization.

We would like to draw the attention on an important issue. The findings contained in this edition of Business for Ocean Sustainability – A Global Perspective are not comparable with the results of the previous edition of the report, and cannot be interpreted as an evolution of companies' attitude towards ocean issues over time. This is due to the following reasons, related to the design of this research:

-Sample composition: the first edition of the research involved multinationals, with headquarters or branches in the Mediterranean region. This year, the sample was broadened to the global economy, including companies from all over the world

- Methodology of analysis: the methodology adopted in this second edition is based on natural language processing and lexicometry methodology applied to data publicly reported by companies, whereas the first edition was based on a quantitative survey and semi-structured interviews.



CHAPTER 1 – THE OCEAN MATTERS AND HAS WIDESPREAD IMPLICATIONS BEYOND THE OCEAN ITSELF

Photo by Kurt Arrigo

We live on a blue planet. The ocean and the seas cover about 71% of the Earth's surface, contain approximately 97% of the available water, and generate about 50% of the oxygen we breathe, more than three times the amount produced by the Amazon rainforest. The ocean is inextricably linked to the climate system through the global exchange of water, energy and carbon, contributing to the regulation of the global climate.[1]

Over 3 billion people (40% of the world's population) depend on the biodiversity and services offered by marine and coastal ecosystems. The ocean supports unique habitats, and contains somewhere between 500,000 and 10 million marine species, most of them still unknown, as up to 2,000 new species are described every year.[2] Services provided by the ocean include food and fresh water supply, renewable energy, benefits for health and well-being, cultural value, tourism, trade, and transport[3], making a major contribution to our economic and social development.

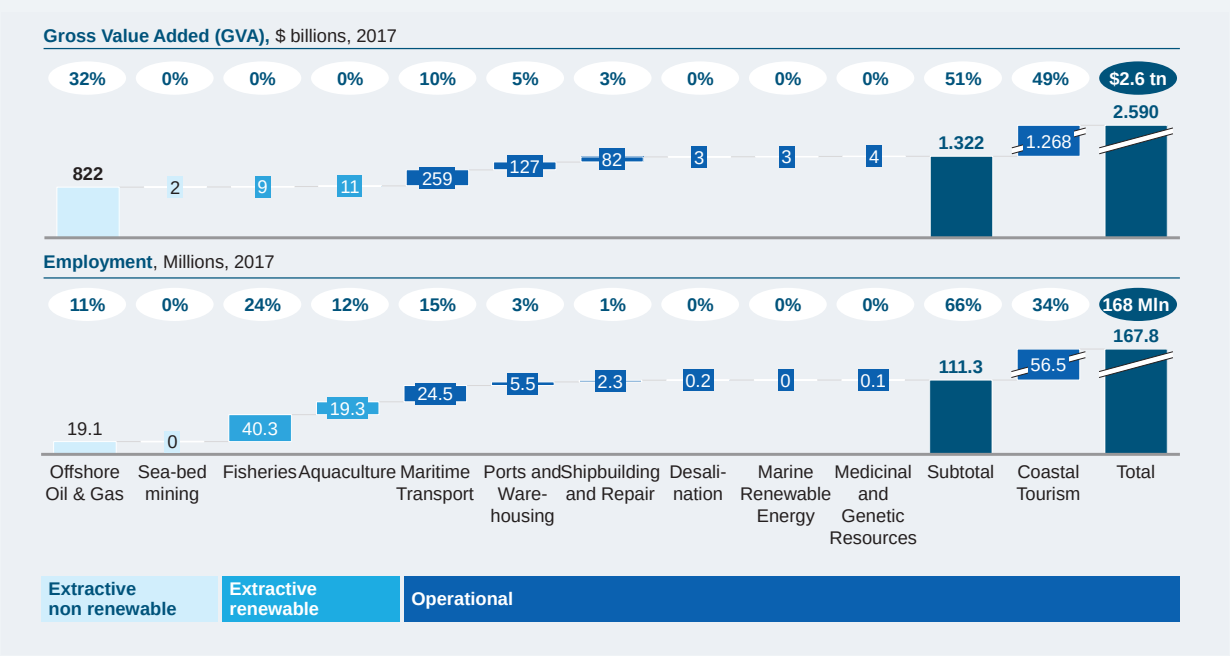
In line with the definitions adopted by the OECD[4] and the World Bank[5], the blue, or ocean, economy encompasses all sectorial economic activities related to the oceans, seas and coasts. The ocean economy comprises seven established sectors: coastal tourism, commercial fishing, industrial aquaculture, shipbuilding and ship maintenance, offshore oil and gas extraction, port activities, shipping and maritime transport, as well as four emerging and innovative sectors: marine renewable energy (including offshore wind and ocean energy), seabed mining, desalination and blue bio economy (genetic and medical resources).

THE OCEAN ECONOMY ACCOUNTS FOR $5.2 TRILLION OF ANNUAL REVENUES, $2.6 TRILLION OF GROSS VALUE ADDED AND GENERATES EMPLOYMENT FOR 168 MILLION PEOPLE

The global ocean economy, measured in terms of the ocean economy sectors' contribution to economic output and employment is significant. It accounts for estimated annual revenues of $5.2 trillion, gross value added (GVA[6]) of $2.6 trillion and generates employment for 168 million people. Among the established ocean economy sectors, coastal tourism accounts for half of the total ocean economy value added, followed by offshore oil and gas (32%), maritime transport (10%), ports and warehousing activities (5%) and shipbuilding and repair activities (3%) (Figure 1). Ocean economy industries provide 168 million jobs, with the largest employers being coastal tourism (34%), fisheries (24%), aquaculture (12%), and maritime transport (15%). The economic value of emerging and innovative sectors (i.e. marine renewable energy, desalination, seabed mining and genetic and medical resources) is still limited but their potential is high.

1 IPCC (2019), IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]
2 UN (2017), The Ocean Conference available at: https://sustainabledevelopment.un.org/content/documents/Ocean_Factsheet_Biodiversity.pdf
3 IPCC (2019), IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]
4 OECD (2016), The Ocean Economy in 2030, OECD Publishing, Paris. http://dx.doi. org/9789264251724-en
5 World Bank and United Nations Department of Economic and Social Affairs. 2017. The potential of the Blue Economy
6 Gross Value Added. The difference between total industry GVA and total GDP is taxes less subsidies on products, which varies across countries

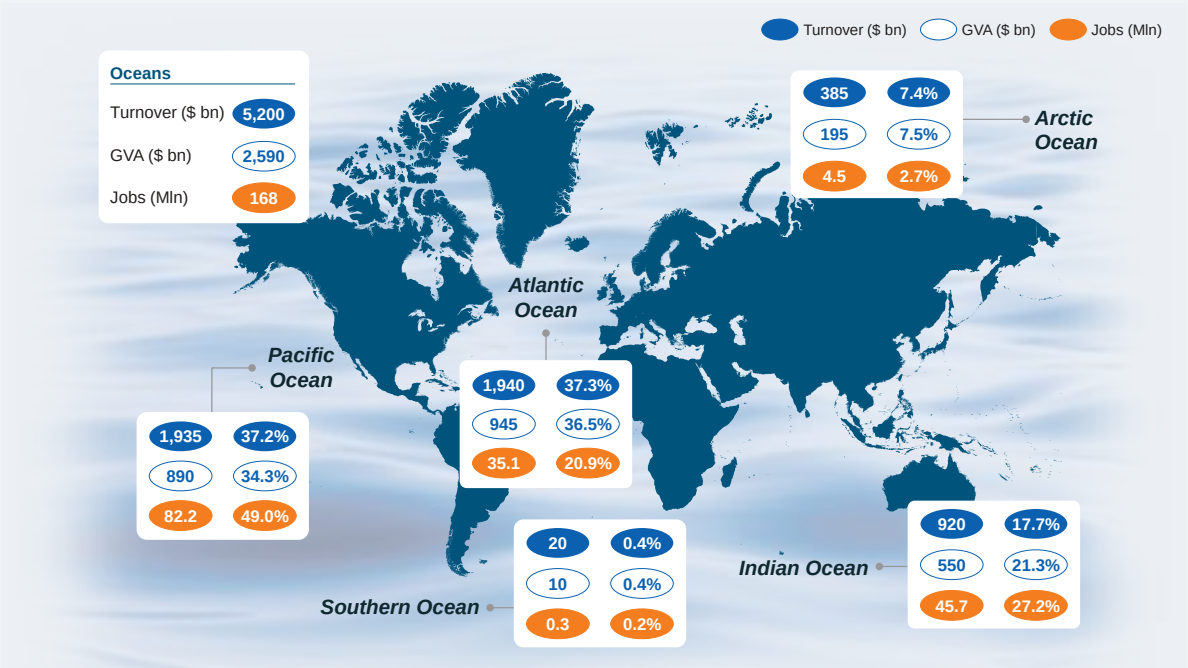
FIGURE 1 - GROSS VALUE ADDED AND JOBS FROM OCEAN ECONOMY SECTORS, 2017



Source: Authors' elaborations based on World Bank (2013); OECD (2014); FAO; Eurostat Database; Rystad Energy Database; WTTC; IHS Markit and various industry reports

Each of the world's oceans (i.e. the Atlantic Ocean, Arctic Ocean, Indian Ocean, Pacific Ocean and Southern Ocean, as defined by International Hydrographic Organization (IHO)) has its own specificities. Therefore, we conducted a regional analysis to provide an overview of the key socioeconomic features of each ocean. In 2017, the Atlantic and Pacific oceans generated almost $1.8 trillion of GVA; this represents 70% of the overall global ocean economy value added (Figure 2). In terms of employment, the Pacific Ocean has the largest share with 82.2 million employees (49% of the World Ocean total), followed by the Indian (27.2%) and Atlantic (20.9%) oceans.

FIGURE 2 – ECONOMIC VALUE OF WORLD OCEAN BY GEOGRAPHIES, 2017



Source: Data as of 2017, Authors' elaborations

According to our calculations the value of the global ocean economy in 2017 was $2.6 trillion or approximately 3.3% of the world gross domestic product (GDP)[7], making the ocean the world's seventh largest economy.

FIGURE 3 – CONTRIBUTION OF OCEAN ECONOMY SECTORS TO REGIONAL ECONOMIES IN TERMS OF GVA, 2017, PERCENTAGE

Contribution of each ocean to its region's GDP

GVA by country
0% >4.5%

	Offshore Oil and Gas	Maritime Transport	Coastal Tourism	Other[1]	Total
Ocean	1.1%	0.3%	1.6%	0.3%	3.3%
Indian Ocean	4.7%	0.6%	1.8%	0.2%	7.3%
Arctic Ocean	0.8%	0.4%	4.0%	0.6%	5.8%
Atlantic Ocean	0.9%	0.2%	1.8%	0.3%	3.2%
Mediterranean Sea	0.3%	0.2%	2.2%	0.2%	2.9%
Pacific Ocean	0.5%	0.4%	1.3%	0.3%	2.5%
Southern Ocean	1.0%	0.2%	0.9%	0.2%	2.3%

Source: Data as of 2017, Authors' elaborations

As illustrated in Figure 3, ocean economy activities in the Indian Ocean generated almost $550 billion or 7.3% of the Indian Ocean regional GDP[8]. The economic importance of this ocean basin is mainly driven by offshore oil and gas activities, concentrated in the Middle East. The ocean economy sectors in the Arctic Ocean accounted for 5.8% of the corresponding regions' GDP[9] and in this case the largest contributor was coastal tourism. The regions in the Atlantic basin generated almost $945 billion through ocean economy activities, corresponding to 3.2% of Atlantic Ocean region's GDP, while the Mediterranean Sea[10] followed, contributing 2.9% of the Mediterranean Sea region's GDP.

Preserving our environmental and socioeconomic wealth is paramount

Preserving the health of marine and coastal ecosystems is paramount due to the many irreplaceable benefits provided by the oceans and the seas, as well as the fact that a healthy marine environment is a habitat in which

7 The world GDP was estimated at $79,712 billion in 2017
8 Calculated as the sum of the GDPs of the country bordering the Indian Ocean. In the case of countries bordering more than one ocean basin, ratios based on coastal lengths were applied
9 Countries that are included in the Arctic Ocean are 10% of USA, 50% of Canada, Greenland and Russia and 30% of Norway
10 The Mediterranean Sea was the specific focus of the first edition of this report. For the purpose of this research, we counted the Mediterranean Sea figures as part of the Atlantic Ocean

businesses can develop and thrive. Human activities exert pressures on the ocean. In recent decades, the degradation of marine and coastal ecosystems has quickly accelerated.

HUMAN ACTIVITIES EXERT PRESSURES ON THE OCEAN. PRESERVING THE HEALTH OF MARINE AND COASTAL ECOSYSTEMS IS PARAMOUNT DUE TO THE MANY IRREPLACEABLE BENEFITS PROVIDED BY THE OCEAN AND THE SEAS

Scientific evidence reports that the global ocean has absorbed more than 90% of the excess heat in the climate system, constantly warming from 1970 onwards. Since 1993 the warming rate has more than doubled, while marine heatwaves have very likely doubled in frequency since 1982, and occur with an increased intensity. Moreover, with the absorption of higher quantities of atmospheric anthropogenic CO_2, the ocean and the seas have undergone a process of increasing acidification.[11] Again, the World Meteorological Organization's (WMO) Statement on the State of the Global Climate in 2019 confirms exceptionally high ocean and land temperatures over the past years, and a record rise in sea level, with a warming trend expected to continue.[12]

Overfishing is widely acknowledged as the greatest single threat to biodiversity and marine wildlife and habitats. The Food and Agriculture Organization (FAO) reports that more than 60% of the world's fish stocks are now fully fished, overfished or depleted. Among the 16 major statistical areas, the Mediterranean and Black Sea have the highest percentage (62%) of unsustainable fishing stocks, followed by the Southeast Pacific (61%) and Southwest Atlantic (59%).[13]

Growth in population and in economic activities will drive additional and accelerating pressures on the marine and coastal environment. Negative consequences not only impact habitats and biodiversity, but also industries based on ecosystem services (e.g. fisheries, agriculture, etc.). The consequences are expected to affect coastal or ocean related activities, but also inland sectors, such as agriculture, infrastructures and services such as energy, transportation, and utilities.

The deterioration of marine and coastal ecosystems can generate significant consequences for economic and social systems: the European Union (EU) estimates a cost of almost €11 billion per year as a result of marine pollution in sectors such as fishing, aquaculture and tourism. It is also expected that the negative effects of climate change in the form of coastal flooding will reach values of between €12 and €40 billion per year by 2050, and that this will directly or indirectly affect the lives of over 700,000 citizens.[14]

Significant changes are needed today to reduce the pressures on marine ecosystems. In Europe, this has been done by establishing the goal of achieving Good Environmental Status (GES). The aim is to restore Good Environmental Status for the sea, as defined by the EU through 11 key descriptors.

In particular, GES refers to *"the environmental status of marine waters*

11 IPCC (2019), IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]

12 WMO (2020), WMO Statement on the State of the Global Climate in 2019

13 FAO (2018), The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Rome.

14 European Commission (2019), The EU Blue Economy Report. 2019, Publications Office of the EU

where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations".[15]

11 Good Environmental Status descriptors

GES is defined through indicators related to 11 descriptors. As pointed out in the Commission Decision 2010/477/EU, the criteria for the achievement of GES are the starting point for the development of coherent approaches in the preparatory stages of marine strategies, including the determination of characteristics of GES and the establishment of a comprehensive set of environmental targets, to be developed in a coherent and coordinated manner in the framework of regional cooperation.

Although GES has only been introduced as a mandatory requirement within the boundaries of the EU, this approach can be applied to all coastal states. Achieving GES is the key target of marine environmental policy and should be considered the desired vision for the future of marine waters.

FIGURE 4 - 11 GES DESCRIPTORS

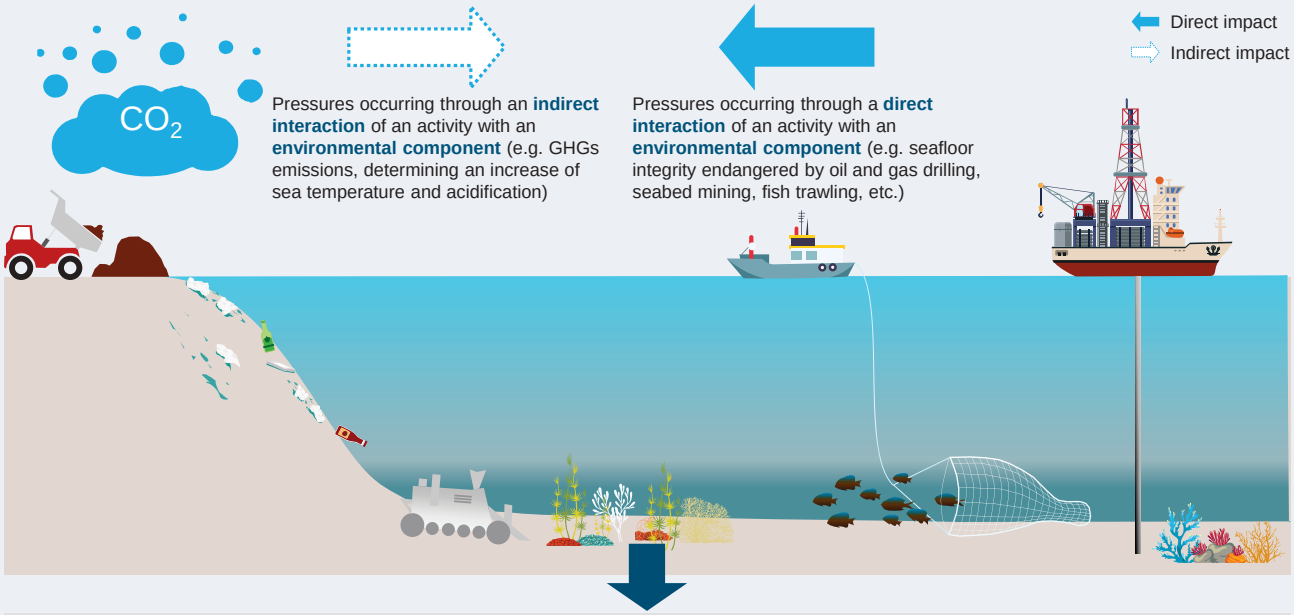
	Biodiversity	Descriptor 1: Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions
	Non-indigenous species	Descriptor 2: Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem
	Commercial fish and shellfish	Descriptor 3: Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock
	Food webs	Descriptor 4: All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity
N P	**Eutrophication**	Descriptor 5: Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom water
	Sea-floor integrity	Descriptor 6: Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected
+PH	**Hydrographical conditions**	Descriptor 7: Permanent alteration of hydrological conditions (i.e. physical parameters of seawater: temperature, salinity, depth, currents, waves, turbulence, turbidity) does not affect marine ecosystems
	Contaminants	Descriptor 8: Concentrations of contaminants are at levels not giving rise to pollution effects
	Contaminants in seafood	Descriptor 9: Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards
	Marine litter	Descriptor 10: Properties and quantities of marine litter do not cause harm to the coastal and marine environment
	Energy incl. underwater noise	Descriptor 11: Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment

15 European Commission (2018), Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)

Direct and indirect pressures are exerted on marine ecosystems

Direct and indirect pressures from production and consumption activities have consequences on marine ecosystems. Pressures occur through direct interaction with environmental components: seafloor integrity, for example, is endangered by oil and gas drilling, trawler fishing, grounding and anchoring, while contaminants in seawater and in seafood enter the marine ecosystem in the form of hydrocarbons leaks, biocides and anti-fouling, coagulants, or anti-foaming directly discharged or spilled into the sea.

FIGURE 5 - DIRECT AND INDIRECT PRESSURES



Source: Authors' elaborations

In contrast, indirect pressures can be observed through indirect interaction with an environmental component: pollution and contaminants, including heavy metals or plastics and microplastics, indirectly reach the sea through land-based sources of discharge such as wastewaters, dumping grounds, fluvial run-offs, or atmospheric deposition.

These pressures can be observed at different spatial scales: at the micro (i.e. with a local area of impact, such as a site, a bay, a gulf), meso (i.e. a regional area, such as a region, or a basin) or macro level (i.e. the entire ocean, or the atmosphere). In addition, direct and indirect pressures include cumulative effects, since the pressures on environmental resources may result from changes determined by past, present and future actions, as well as from their interactions. Table 1 below reports the results of the extensive literature review carried out for this project, highlighting not only the main direct pressures, but also the indirect pressures exerted on the 11 GES descriptors.

TABLE 1 - MAIN SOURCES OF DIRECT AND INDIRECT PRESSURES ON 11 GES DESCRIPTORS

GES descriptions	Main sources of direct pressure	Main soruces of indirect pressure
Biodiversity	Multiple and cumulative pressures on biodiversity derive from over-exploitation of natural species, introduction of non-indigenous species, eutrophication, seafloor destruction or alteration, changes in hydrographical conditions, pollution, climate change	Multiple and cumulative pressures on biodiversity derive from land-based sources of pollution, dumping grounds, fluvial run-offs. Major land-based pressures to biodiversity are exerted by inorganic pollution, fertilizers, pesticides[16]
Non-indigenous species	Natural invasion through waterways (also due to global warming and Sea Surface Temperature increase), transportation by ships, intentional or unintentional introduction by aquaculture, including commercial species, bait, aquarium trade	250 bn pieces of marine litter (including plastics and microplastics) floating in the Mediterranean Sea are expected to be potential carriers for alien and invasive species[17]
Commercial fish and shellfish	Over-exploitation, by-catch, direct and indirect impacts from fishing gears and trawler fishing, pollution, contaminants and marine litter in sea waters are the main pressures on commercial fish and shellfish. Overfishing is the greatest single threat	
Food webs	Overfishing, eutrophication, modification of hydrographical conditions, introduction of non-indigenous species, pollutants and marine litter, and alteration of marine habitats can impact food webs and nutrient chains	Chemical and nutrients run-offs from rivers and land-based activities (e.g. agriculture), as well as pollution and contaminants from industrial activities can exert pressure on marine ecosystems (flora and fauna) and alter marine food webs and nutrient chains
Eutrophication	Excessive emission of nutrients through coastal wastewater treatment plants, discharges from aquaculture, ships and vessels, and tourism facilities. The largest emissions of organic matter in coastal areas originate from urban/domestic and industrial wastewaters entering marine environments through direct discharges[18]	Organic and inorganic nutrient run-offs from rivers or from farming of animals, manure and fertilizers cause eutrophication of coastal areas
Seafloor integrity	Trawler fishing causes severe alterations of shallow (e.g. seagrass meadows) and deep-water ecosystems, reducing the number of species and the available habitats. Drilling, seabed exploitation, dredging, grounding and anchoring exert additional significant threats to benthic and shallow water ecosystems[19]	High-density marine litter accumulation on seafloor (continental shelves, canyons and deep-sea-environments) is highly reported in the Mediterranean Sea, with plastic as the main marine litter component[20]
Hydrographical conditions	Local and regional direct sources of pressure relate to sediment resuspension, and to altered conditions in localized hotspots (salinity, acidity, temperature)	GHG emissions from industrial, agriculture and household activities influencing climate change and determining sea temperature rise, higher water acidity, decrease of oxygen
Contaminants	Hydrocarbons leaks and spills, biocides and anti-fouling, coagulants, anti-foaming agents, and heavy metals are all present in Mediterranean waters	Land-based sources of pollution such as wastewaters, discharge points and dumping grounds, fluvial run-offs, atmospheric deposition
Contaminants in seafood	Contaminants in sea waters, and especially heavy metals that cannot be degraded, represent a serious threat for marine species as well as for human consumption	Land-based sources of pollution, including contaminants and heavy metals, reach the sea through fluvial run-offs and atmospheric deposition and can contribute to seafood contamination. Recently discovered seafood contaminants relate to microplastics
Marine litter	Plastic, wood, metal, clothing, and paper waste originating from coastal household and municipal disposal, tourism facilities, pleasure craft and commercial vessels, are the main sources of marine litter and pollution. Plastic is by far the most common type of litter	Plastic, wood, metal, clothing, paper run-offs from rivers and land-based production and consumption activities
Energy incl. underwater noise	Energy, heat, noise, and vibrations introduced and/or discharged in water from exploration and exploitation activities, commercial transportation and pleasure crafts exert an increasing pressure on the aquatic ecosystems	

16 WWF Mediterranean, Randone, M. (2016), MedTrends Project: Blue Growth Trends in the Adriatic Sea - the challenge of environmental protection
17 UNEP/MAP (2012), State of the Mediterranean Marine and Coastal Environment
18 UNEP/MAP (2012), State of the Mediterranean Marine and Coastal Environment
19 UNEP/MAP (2012), State of the Mediterranean Marine and Coastal Environment
20 UNEP/MAP (2018), 2017 Mediterranean Quality Status Report

Developing a robust analysis of industrial pressures on the ocean and the seas is a complex process. In this report, a solid scientific review was conducted thanks to the support of 56 natural and social scientists from leading research institutes and universities across Europe, North and South America and Australia who participated in the project, providing their expertise. According to their independent assessment, all industries directly or indirectly interacting with the ocean/seas potentially exercise negative pressures on most of the 11 GES descriptors.

Ocean or coastal based industries (e.g. fisheries, maritime transportation, ports and warehousing) have long been recognized for their "direct" pressures on marine ecosystems. However, indirect pressures from other sectors (e.g. chemicals, agriculture, energy) cannot be neglected and require adequate business responses. Several studies suggest that the pressures exerted by land-based activities exceed those of direct ocean industries.

THE MOST SERIOUS ISSUES THREATENING THE HEALTH OF THE OCEAN ARE ACIDIFICATION, THE LOSS OF MARINE BIODIVERSITY, AND THE INTRODUCTION OF CONTAMINANTS AND POLLUTION IN AQUATIC ECOSYSTEMS

Overall, as confirmed by IPCC[21], acidification is one of the most serious issues threatening the health of the ocean, a reduction in the pH of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide from the atmosphere, closely linked to climate change, the release of contaminants into the environment that eventually reach the sea, the eutrophication of marine ecosystems, and the loss of biodiversity.

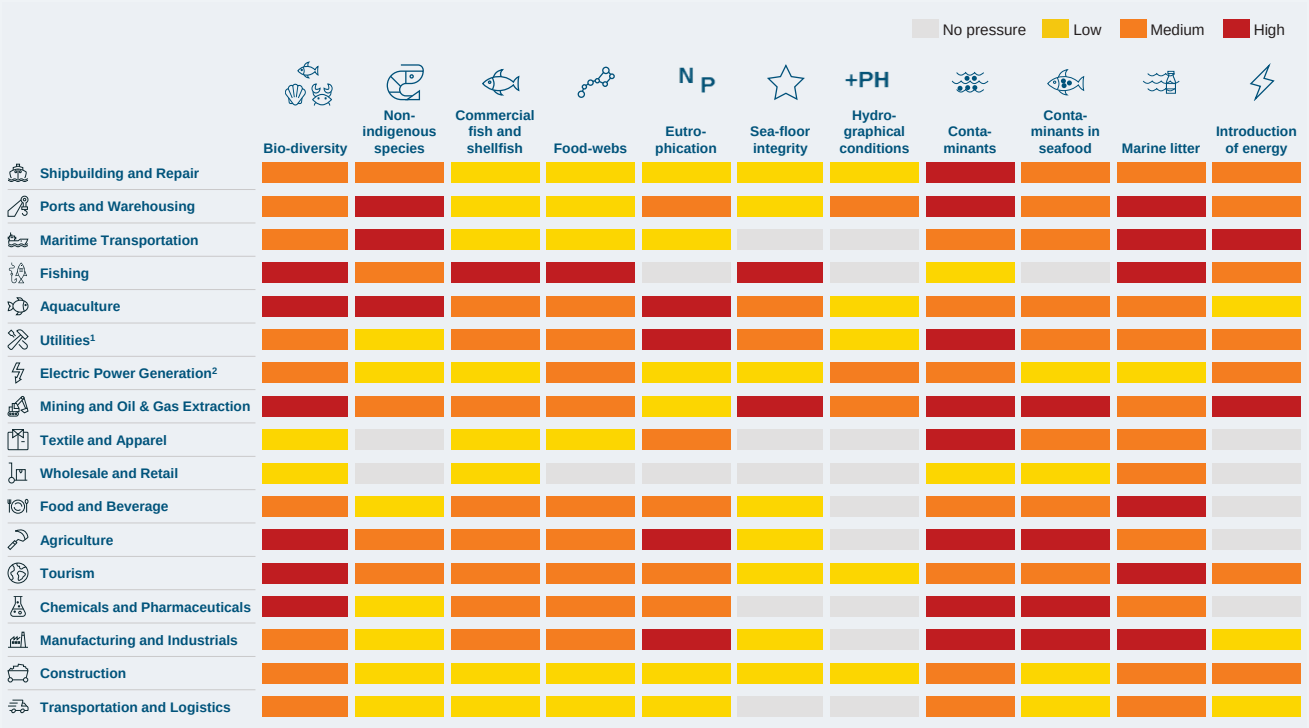
In this perspective, the scientific review confirmed the most significant pressures for ocean health (biodiversity and clean waters) as being those related to:

- The **effects on marine biodiversity**, including the depletion of fish stocks and the alteration of food webs (e.g. over-exploitation of marine resources, introduction of non-indigenous species), also co-determined by a number of different causes, such as the introduction of contaminants and pollution into the marine environment, the modification of the hydrographical conditions of waters (e.g. sea temperature rise, acidification, and decrease of oxygen), the eutrophication or the alteration of seafloor integrity
- The **introduction of contaminants in marine ecosystems, including their presence in seafood**, either through direct interaction with the marine environment, or indirectly through wastewaters, discharge points and dumping grounds, or atmospheric deposition. Water releases are mostly related to the fertilizer industry, metal industry, wastewater treatment plants, energy and chemical sectors
- The **pollution of the ocean and marine environments through the discharge of litter and other human-created waste**, such

21 IPCC (2019), IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]

as plastic, glass, paper, metal, cloth, rubber, fishing-related items, wood, smoking-related items, sanitary waste, and other unidentified items, with plastic, cigarette butts, and glass beverage bottles, food wrappers, bottle caps, straws/stirrers, bags and lids being the top items found on beaches. Plastic is also the main component of floating and seafloor marine litter, while recent studies focusing on marine pollutants at the size of microplastics or nanoplastics[22], reveal that the main types found are hard plastics, fibers, and nylon[23], deriving, to a large extent, from various land-based industrial and consumption sources. Primary microplastics include industrial scrubbers, plastic powders used in molding, microbeads employed in cosmetic formulations, virgin resin pellets used by the plastic manufacturing industry, and nanoparticles from a variety of other industrial processes. Secondary microplastics result from the fragmentation of larger plastic items during the use of products such as textiles (e.g. fibers released into wastewater effluents due to washing of clothes), paint degradation and abrasion of tires, or once the plastic items have been disposed of in the environment.[24] As extensively reported by several different studies, 80% of plastic pollution is estimated to be of land-based origin, due to mismanaged processes, such as littering or dumping in unregulated landfills[25]

FIGURE 6 – REVIEW OF NEGATIVE DIRECT AND INDIRECT PRESSURES OF VARIOUS SECTORS



Source: Experts scientific review, total no. = 56

22 Primary microplastics, produced originally at microscopic size, or secondary microplastics, fragments from originally larger plastic items

23 UNEP/MAP (2018), 2017 Mediterranean Quality Status Report https://www.medqsr.org/sites/default/files/inline-files/2017MedQSR_Online_0.pdf

24 GESAMP (2015), Sources, fate and effects of microplastics in the marine environment: a global assessment (Kershaw, P. J., ed.). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection)

25 Ocean Conservancy & McKinsey Center for Business and Environment (2015), Stemming the Tide: Land-Based Strategies for a Plastic-Free Ocean

CHAPTER 2 – DESPITE EMERGING MORE RECENTLY, OCEAN-RELATED ISSUES HAVE STRONGLY INCREASED IN RELEVANCE FOR COMPANIES

Photo by Kurt Arrigo

SDG14 “Life Below Water” is one of the least prioritized SGDs by companies, but business attention has increased over the past four years

We started our project by evaluating companies’ commitment to sustainability and ocean-related issues through the analysis of the current state of adoption of Sustainable Development Goals (SDGs) by businesses. Launched in 2015, as part of the United Nations 2030 Agenda for Sustainable Development, the 17 SDGs offer a roadmap to support business organizations as they deal with the major global challenges of this century. The inclusion of SDGs in companies’ reports is considered a measure of their relevance for businesses and an indicator of their engagement with sustainability.

The main objective of this chapter is to assess the current state of adoption of SDG 14 Life below water, in comparison with the other SDGs. This specific goal addresses the conservation of marine and coastal ecosystems through setting specific targets. We consider the inclusion of SDG 14 in corporate reporting as an indicator of the level of attention that companies devote to ocean-related issues. However, we acknowledge that this measure is neither conclusive to evaluate the degree of awareness of companies with regard to their pressures on marine ecosystems, nor exhaustive when it comes to understanding business responses to address ocean challenges (e.g. new technologies, novel products, innovative materials).

For the analysis of companies mentioning SDG 14, our research project includes sustainability reports from 1,664 individual companies belonging to 16 industrial sectors (see Annex I for detailed information). The full sample also comprises 69 organizations from ocean economy sectors (i.e. fishing and aquaculture, maritime transportation, shipbuilding and repair, ports and warehousing) that represent businesses with a direct link to the ocean.

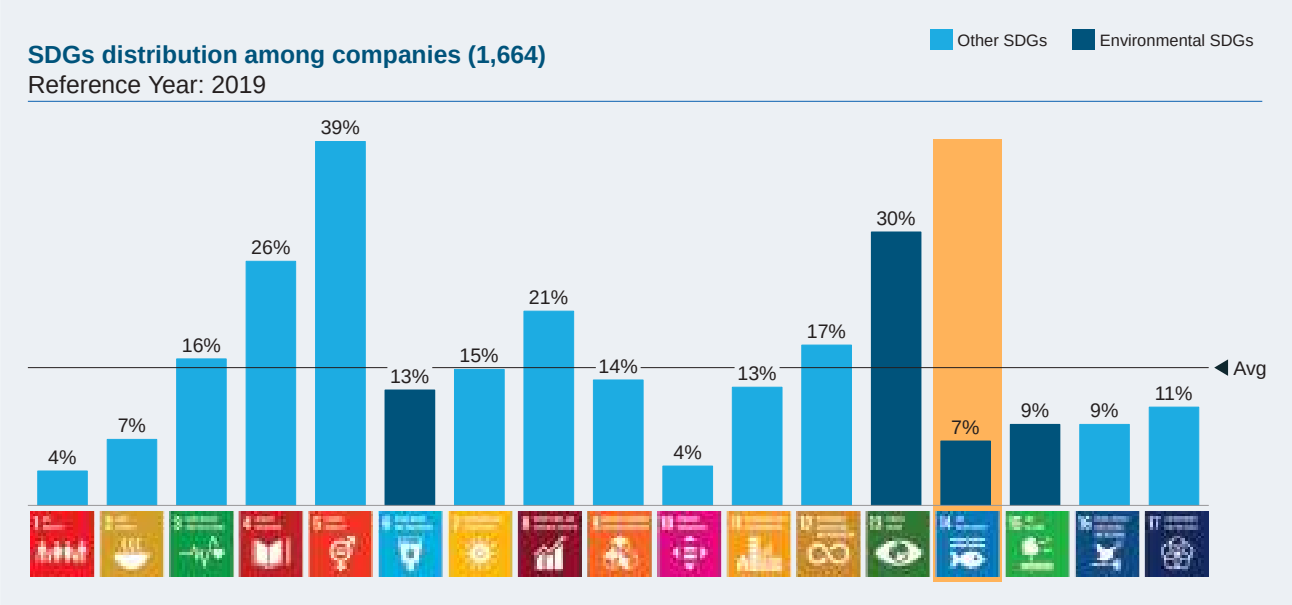
60% OF THE COMPANIES ANALYZED HAVE A COMMITMENT TO AT LEAST ONE SDG, BUT SDG 14 IS INCLUDED BY JUST 7% OF THE COMPANIES ASSESSED

Our findings suggest that 60% of all the companies analyzed have commitment to at least one SDG and, on average, they prioritize 4 of the 17 Goals in their annual sustainability reports. As regards the geographical distribution, the higher percentage of firms that include SDGs are in Oceania, where 75% of companies analyzed mention at least one Goal. In the Middle East and North Africa the number slightly decreases to 69% followed by Europe (67%), Africa (65%), Asia (64%) and Americas (49%).

Of the 17 Goals, SDG 14 is included by just 7% of the companies assessed. Our findings show that SDG 14 is one of the least prioritized and the one that receives least attention among the environmental SDGs (SDG 6 Clean water and sanitation, SDG 13 Climate action, SDG 14 Life below water and SDG 15 Life on land). Our findings show that the majority of companies are mainly focused on SDG 5 Gender equality, SDG 13 Climate action and SDG 4 Quality education. On the contrary, SDG 1 No poverty, SDG 10 Reduced inequalities, SDG 2 Zero hunger and SDG 14 Life below water are the least mentioned. The SDGs that receive more attention in the reports can be considered as

priority issues, or business areas where companies believe they can make a greater positive impact in contributing to the 2030 Agenda for Sustainable Development. Furthermore, these SDGs probably offer more standardized guidelines for reporting data and results, also following, in several cases, the evolution of legislative frameworks requiring the disclosure of non-financial information on specific issues (e.g. gender equality, main environmental issues).

FIGURE 7 – DISTRIBUTION OF SUSTAINABLE DEVELOPMENT GOALS AMONG COMPANIES – 2019

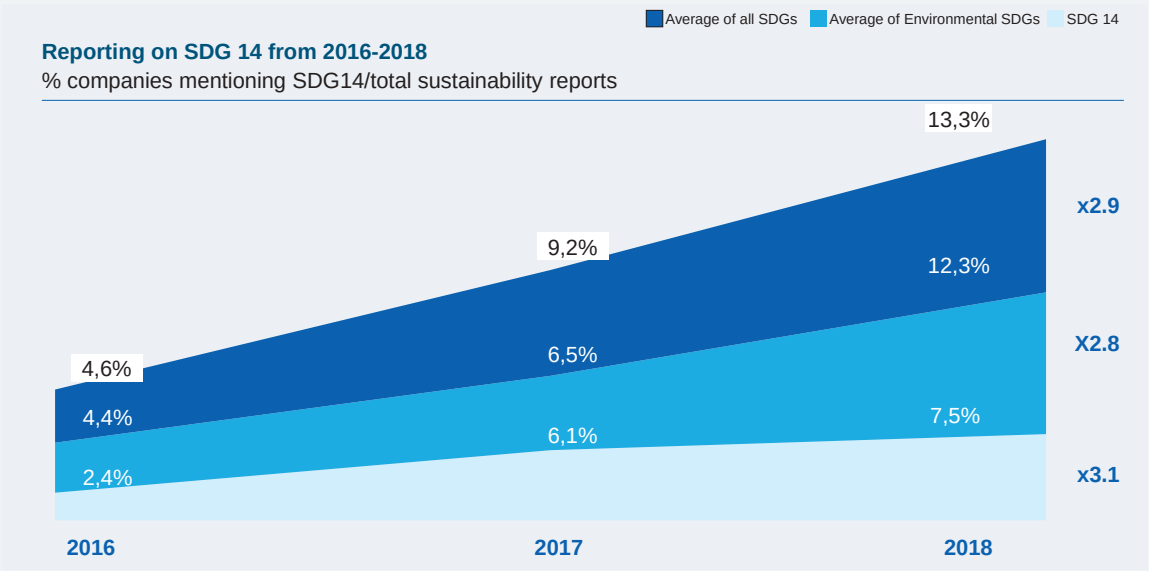


Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

SDG 14 LIFE BELOW WATER IS ONE OF THE LEAST PRIORITIZED SDGS, BUT THE ATTENTION GIVEN TO SDG 14 HAS MORE THAN TRIPLED OVER THE PAST 4 YEARS

Despite being one of the least mentioned, the attention given to SDG 14 has more than tripled over the past 4 years and the number of companies referring to it has increased from a mere 2.4% (2016) to 7.5% (2018). Moreover, when we compare this trend with the trends of the other SDGs (considered as a whole, or only the environmental ones), it is evident that they follow the same growth pattern, but the relevance of SDG 14 in the business community has grown more than the others. Overall, our findings suggest that companies' commitment to sustainability is following a positive trend, and the consideration given to preserving marine and coastal ecosystems is increasing at higher rate.

FIGURE 8 – SUSTAINABLE DEVELOPMENT GOALS REPORTING FROM 2016 TO 2018



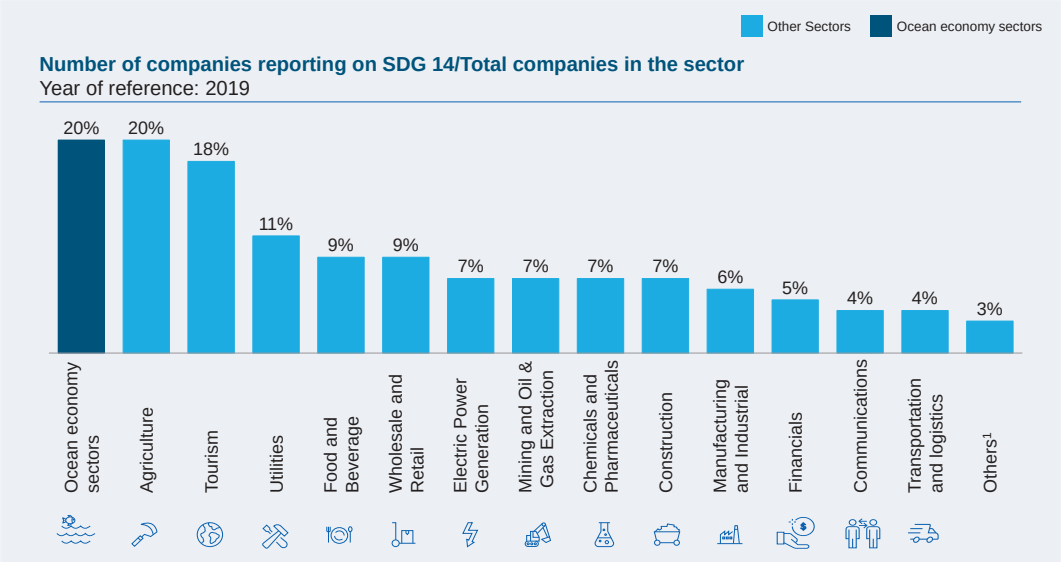
Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

20% OF OCEAN ECONOMY COMPANIES INCLUDE SDG 14 IN THEIR SUSTAINABILITY REPORTS, SINCE THEY HAVE A DIRECT LINK WITH THE MARINE ENVIRONMENT

Ocean economy companies mention SDG 14 more frequently than companies from other sectors and SDG 14 is among the most frequently adopted SDG by ocean economy firms

Attention to SDG 14 is higher among companies in the ocean economy (fishing and aquaculture, maritime transportation, shipbuilding and repair, ports and warehousing): 20% include SDG 14 in their sustainability reports (with the same figure shown for agriculture). Not surprisingly, the findings corroborate the idea that a direct link exists between these companies and the protection of the marine environment, which explains why this goal is considered core in their sustainability strategies.

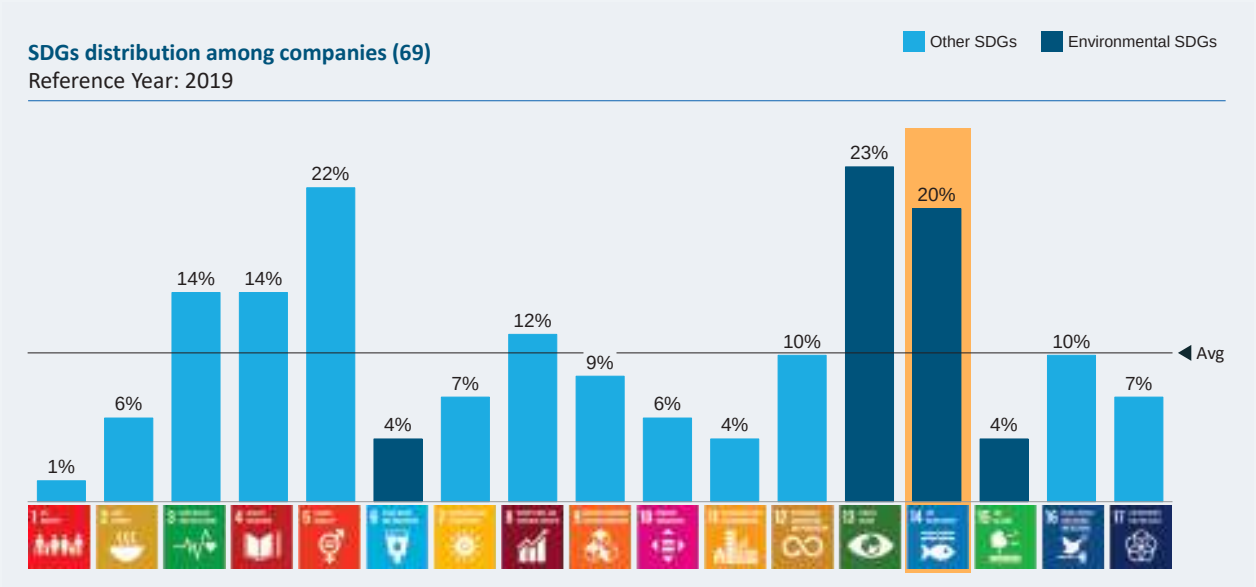
FIGURE 9 – NUMBER OF COMPANIES REPORTING ON SDG 14 / TOTAL COMPANIES IN THE SECTOR – 2019



1 Includes: IT Services, Business Support Services, Industrial Conglomerates, Healthcare
Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

This result is also confirmed by the analysis of the distribution of SDGs among firms within the ocean economy. In fact, SDG 14 is among the goals most frequently mentioned by these companies (20%), after SDG 13 Climate action, which is the most frequently reported (23%), and SDG 5 Gender equality, which ranks second (22%). This finding can be explained by considering that climate change has become a major issue for all industries, and that there are many international mechanisms and frameworks to help companies in reporting their impact and monitoring their strategic responses.

FIGURE 10 – DISTRIBUTION OF SDGS AMONG OCEAN ECONOMY COMPANIES



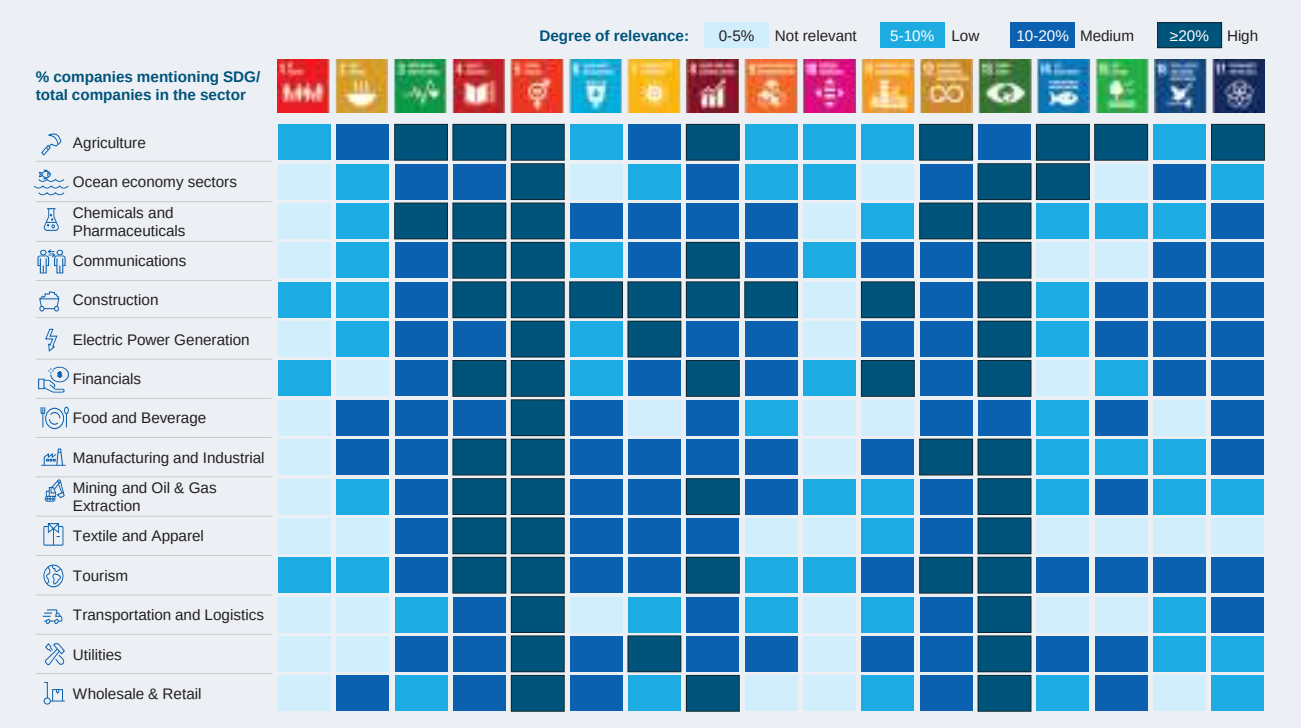
Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

Not all SDGs are relevant to all organizations, as the SDGs represent different opportunities across industries

In our report, we analyzed the distribution of SDGs over 16 industries. We measured the degree of relevance of each goal based on the number of companies that report it. What is evident is that SDG 5 Gender equality, SDG 13 Climate action and SDG 4 Quality education, are those that have a higher relevance in all sectors, while SDG 1 No poverty, SDG 10 Reduced inequalities, SDG 2 Zero hunger and SDG 16 Peace, justice and strong institutions, receive less attention.

The construction sector has the highest number of prioritized SDGs, while in food and beverage the most-mentioned SDG is number 5, relating to Gender equality. Our findings suggest that companies tend to prioritize those SDGs that they believe are core to their business. The decision to focus on one goal or another also depends on the perception of the role that the company can play in responding to the specific sustainability challenges.

FIGURE 11 – DISTRIBUTION OF SDGS ACROSS INDUSTRIES – REFERENCE YEAR: 2019

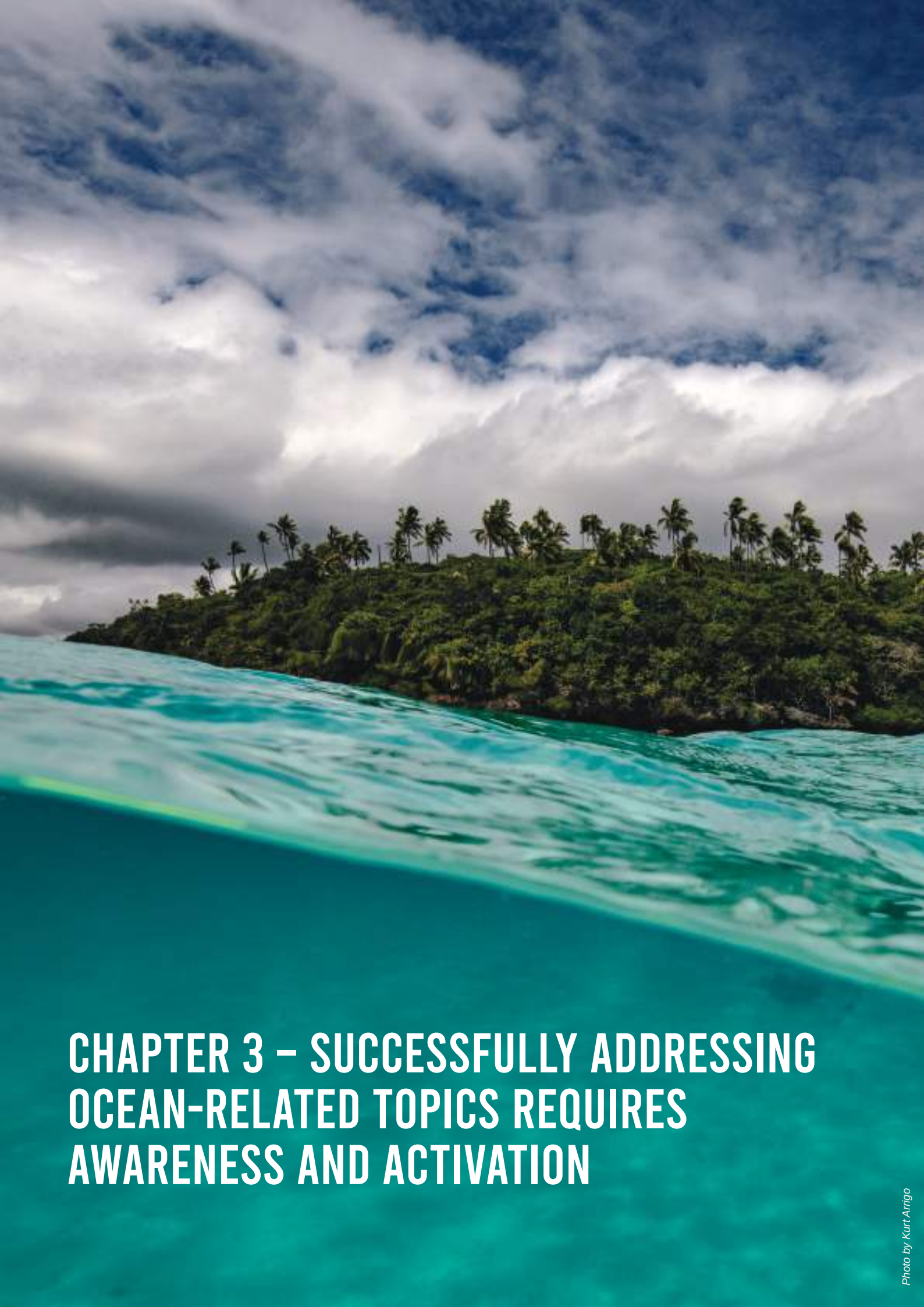


Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

UN Global Compact Sustainable Ocean Business Action Platform

In June 2018 the United Nations Global Compact launched the Sustainable Ocean Business Action Platform, aimed at gathering leading businesses, organizations, research and academia institutions and governments to address how ocean-related industries can foster progress towards achieving the Sustainable Development Goals (SDGs).

The platform promotes several activities, aimed at enhancing the awareness and the activation of the business community, including the launch of the Sustainable Ocean Principles, intended to emphasize the responsibility of companies in contributing to a healthy and productive ocean, and the publication of reports and working papers, highlighting the connections between a healthy, productive and well-governed ocean and the achievement of the 17 SDGs.

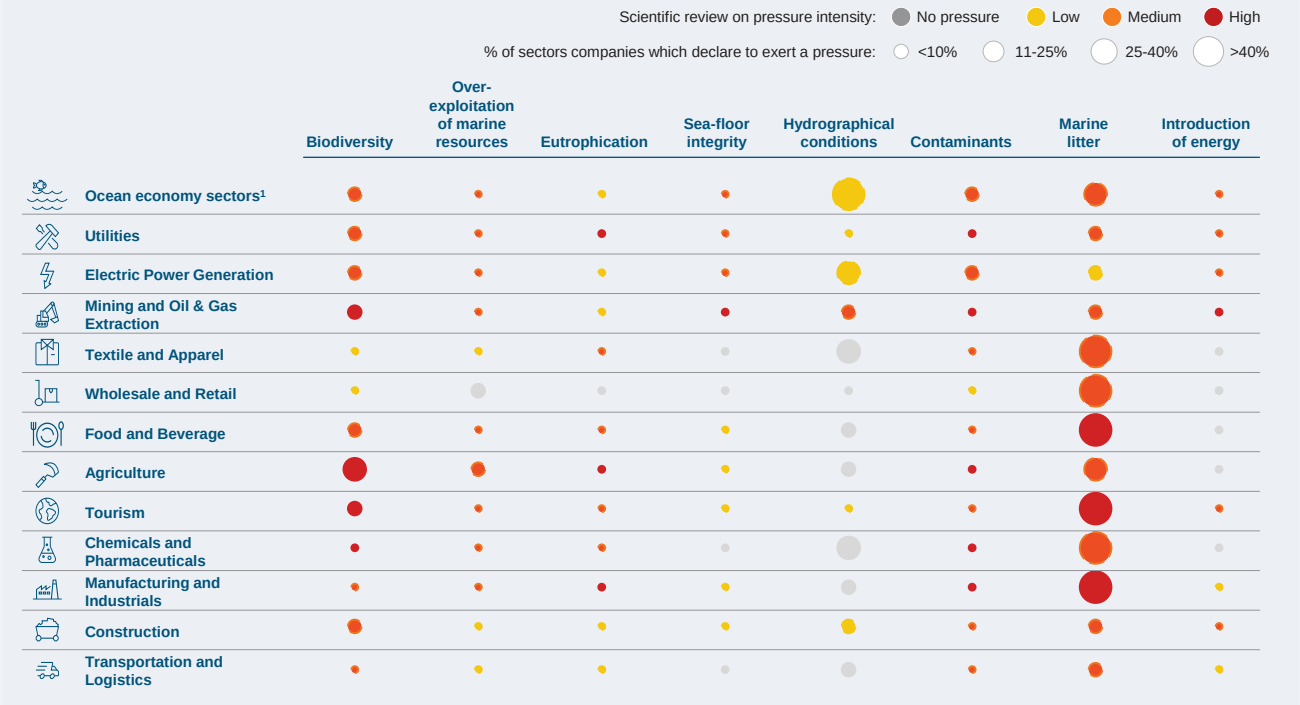


CHAPTER 3 – SUCCESSFULLY ADDRESSING OCEAN-RELATED TOPICS REQUIRES AWARENESS AND ACTIVATION

Photo by Kurt Arrigo

51% of companies show awareness, albeit to varying degrees, when considering the potential pressures of their industries on the ocean (GES descriptors), but only a limited number acknowledge all the types of pressure

FIGURE 12 – COMPANIES' AWARENESS OF THE NEGATIVE PRESSURES THAT THEIR INDUSTRIES CAN EXERCISE ON SELECTED GES DESCRIPTORS - OCEAN SECTORS VS. OTHER SECTORS



1 Include: Fisheries and Aquaculture, Maritime Transportation, Shipbuilding and Repair, Ports and Warehousing
Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

MARINE LITTER, BIODIVERSITY AND HYDROGRAPHICAL CONDITIONS (MOSTLY ASSOCIATED WITH ACIDIFICATION) ARE THE ISSUES MOST FREQUENTLY MENTIONED BY COMPANIES. CONVERSELY, AWARENESS OF PRESSURES ON LESS PUBLICIZED PROBLEMS IS STILL LIMITED

We define companies as being "aware" of the negative pressures directly and indirectly exerted by their activities on marine and coastal ecosystems when their acknowledgement matches the opinion of ocean science experts.

Our findings show that 51% of companies are aware, albeit to varying degrees, of the potential pressures of their industries on the ocean, measured on selected GES descriptors, but only a limited number of them acknowledge all the types of pressure (Figure 12).

Marine litter (mostly plastic), biodiversity and hydrographical conditions (mostly associated with acidification) are the issues most frequently mentioned by companies. Almost all sectors, to different degrees, are aware of the pressures directly or indirectly exerted on these descriptors. This level of concern can be considered as the result of growing attention from different stakeholders (e.g. media, policy makers, social movements, consumers). Conversely, awareness of pressures on less publicized problems, such as over-exploitation of marine resources, eutrophication, seafloor integrity and the introduction of energy in marine ecosystems is still limited, even though experts consider them to be relevant for most of the sectors. For example,

almost none of the companies from the sectors of mining and oil and gas extraction mention seafloor integrity, and only a few food and beverage companies report on over-exploitation of marine resources.

When we look at the ocean economy sectors, they follow approximately the same pattern as others, with higher percentages of firms reporting on biodiversity, hydrographical conditions and marine litter, while they do not properly identify less publicized issues. For example, none of the companies belonging to ports and warehousing acknowledges its pressures on hydrographical conditions (e.g. changes in depth, currents, waves, or turbidity of waters and coastal environment), similarly fisheries and aquaculture companies seem unaware of the pressures exerted on seafloor integrity by their industry (e.g. caused by trawler fishing) and maritime transportation companies do not report on introduction of energy in the ocean. Nonetheless, a number of companies in the maritime sectors mention less publicized topics, when relevant to their industries. This is the case for a number of fishing and aquaculture firms that appear to be aware of the problem of the over-exploitation of marine resources and for a number of maritime transportation companies that are concerned about contaminants.

At the same time, there are cases in which companies report pressures not considered significant for their industry by ocean scientists: 70% of maritime transportation firms report on hydrographical conditions, as well as more than 1 in 3 companies in fishery and aquaculture, chemical and pharmaceutical and textile industries. Similarly, 1 company out of 4 in the retail and wholesale sector claims to be responsible for the over-exploitation of marine resources, while scientists consider the pressures of these industrial sectors as a minor problem.

These results show the existence of a mismatch between the ocean scientists' review of pressures from different industries on GES descriptors and the corresponding awareness of companies, as disclosed in their sustainability reports.

44% of companies deploy activities that are beneficial for marine and coastal ecosystems. Awareness does not always imply response

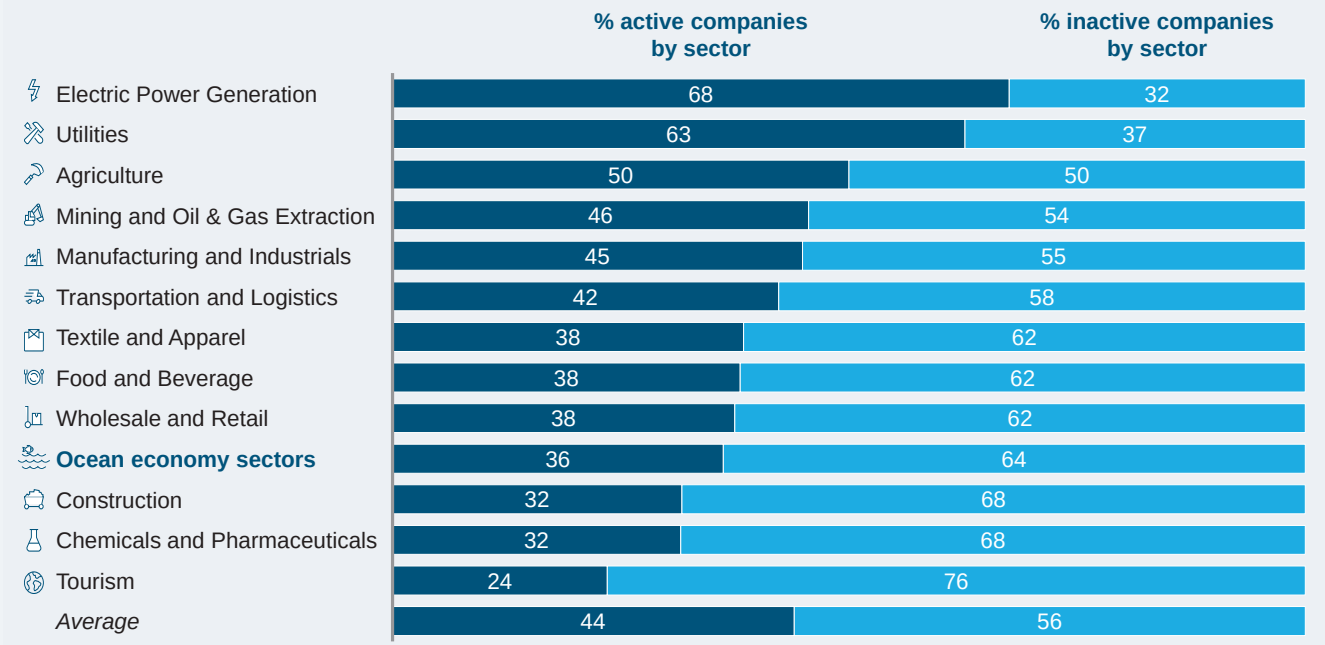
PRODUCT AND PROCESS INNOVATIONS AND SUPPLY CHAIN SOLUTIONS, EVEN WHEN INDIRECTLY RELATED TO OCEAN HEALTH, CAN HELP COMPANIES TO MITIGATE THEIR PRESSURES ON MARINE ECOSYSTEMS

Companies can reduce or offset their negative pressures on marine and coastal ecosystems by deploying mitigating activities, whether they be product innovations, process innovations or supply chain solutions. Mitigating activities can be directly related to ocean protection or indirectly beneficial for it. In the second case, for example, cutting emissions curbs the alteration of hydrographical conditions (i.e. GHG emissions contribute to climate change and determine sea temperature rise, higher water acidity, decrease of oxygen) and recycling programs can tackle marine litter.

Electric power generation, utilities and agriculture are the sectors with the highest percentages of active companies, contributing in particular to the

development of renewable energy sources and technological solutions for emission reduction. The chemical and pharmaceutical industry and tourism meanwhile, perform more poorly than others, even though they are the most active, respectively, on product life cycle assessment and plastic reduction (Figure 13)

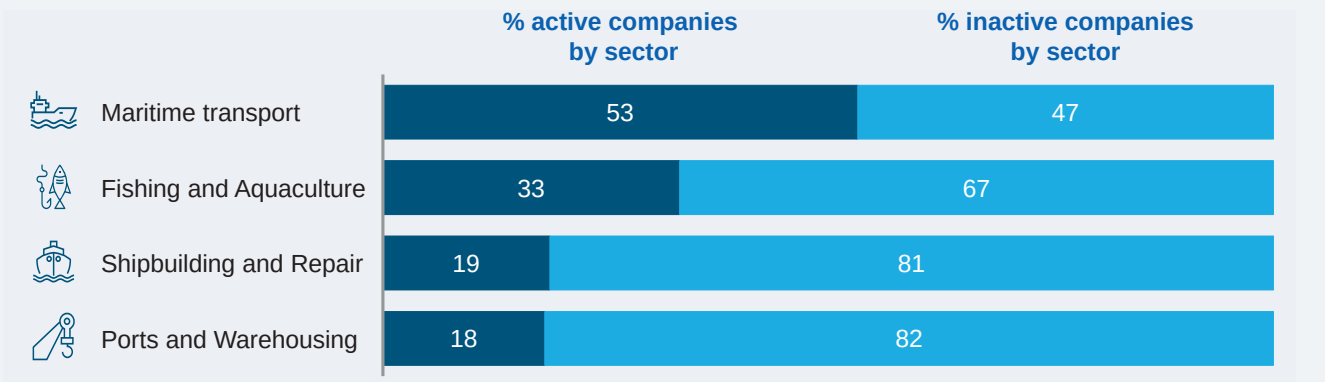
FIGURE 13 – PERCENTAGE OF COMPANIES DEPLOYING ACTIVITIES THAT CAN BENEFIT THE OCEAN – OCEAN ECONOMY VS OTHER SECTORS



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

When looking at the ocean economy sectors, about 36% of companies engage in activities that can benefit the ocean. In marine transportation more than half of the companies develop mitigation initiatives, followed by fishing and aquaculture (33%). The percentage drops to less than 20% in the ship-building and repair, and ports and warehousing industries (Figure 14).

FIGURE 14 – PERCENTAGE OF COMPANIES DEPLOYING ACTIVITIES THAT CAN BENEFIT THE OCEAN – OCEAN ECONOMY SECTORS



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

Considering that 51% of companies are aware to varying degrees of their pressures on ocean health, the fact that 44% of companies are active on ocean issues shows that there are still cases where awareness does not correspond to activation. In other words, there are companies that mention ocean-related problems, but do not report on activities carried out to mitigate them. What emerges is another misalignment: a gap between being aware of an environmental problem and responding through specific initiatives.

Awareness and activation gates exist and need multi-level responses

Our findings suggest the existence of two potential gaps. First, a mismatch between the ocean scientists' review of industry pressures on GES descriptors and the corresponding consciousness of companies, as disclosed in their sustainability reports. Secondly, a gap between firms' awareness of their pressures on the ocean and related activities to reduce them. Unlocking both awareness and activation is crucial to engage companies in the preservation of healthy marine and coastal ecosystems.

The evidence shows awareness and/or activation "gates" in most sectors. A cross-sector and common example of an awareness gap regards GHG emissions. In fact, about 5 companies out of 10 carry out a carbon footprint assessment and cut their emissions, and more than 7 firms out of 10 implement energy efficiency measures, but less than 1 company out of 10 links emissions to ocean hydrographical conditions. Therefore, there are companies that are already active on ocean preservation, but that are not aware of the positive consequences of their activities on marine and coastal ecosystems.

An example related to the activation gate, meanwhile, concerns the chemical sector and microplastics. Even though marine litter is among the most acknowledged issues in relation to ocean protection and 1 company out of 2 in the chemical industry is aware of it, almost none of them report on activities aimed at tackling microplastic dispersion in marine and coastal ecosystems, due to the lack of effective and commercially viable solutions.

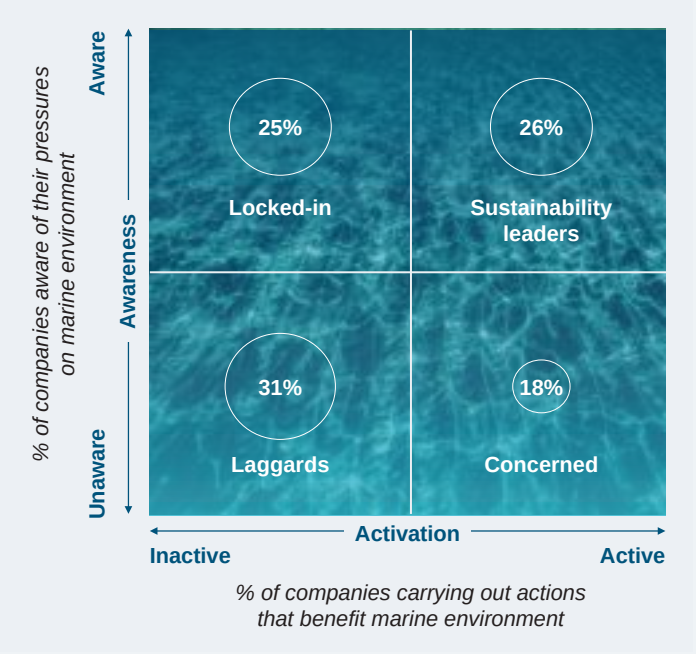
UNLOCKING ACTIVATION REQUIRES ORGANIZATIONAL CHANGES, THE AVAILABILITY OF EFFICIENT AND VIABLE TECHNOLOGICAL SOLUTIONS AND THE RESOLUTION OF OPERATIONAL, ECONOMIC AND INSTITUTIONAL CONSTRAINTS

Building on these two dimensions, awareness and activation, companies can be categorized into four clusters: 26% of the companies in our sample are simultaneously aware and active (sustainability leaders), while 31% are not aware and not active (laggards); 25% of companies are aware but inactive (locked-in) and the remaining 18% are unaware but active (concerned) (Figure 15).

In order to address the sustainability of the ocean and marine ecosystems, it is necessary to focus on both dimensions and unlock awareness and activation. In our opinion, unlocking activation is more complex than increasing awareness, and needs both multiple resources and more time. The development of campaigns on ocean protection that engage different stakeholders and social sectors (e.g. media, business organizations, industrial associations, governmental agencies, and civil society) can accelerate greater

consciousness among companies and business leaders. Diversely, the possibility of activating responses calls for organizational changes, the availability of efficient and viable technological solutions, as well as the resolution of other types of constraints (e.g. operational, economic, financial, and institutional impediments) that “lock-in” companies and prevent them from acting.

FIGURE 15 – DISTRIBUTION OF COMPANIES ACCORDING TO AWARENESS AND ACTIVATION (% OF COMPANIES)



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies’ sustainability reports from Datamaran and other databases

To unlock awareness and activation, businesses must recognize that maintaining a healthy marine environment is a fundamental prerequisite for long-term operations. Businesses have a shared responsibility -with civil society and governments- to take the actions necessary to secure a healthy, resilient and productive ocean in line with SDG14 and its targets. Understanding the limits and the carrying capacities of the ocean is a basic need for every company that aims for long-term survival.

CHAPTER 4 – SUSTAINABILITY LEADERS EXIST ACROSS ALL INDUSTRIES

Sustainability leaders are more aware and more active than other companies. They represent 1/4 of the sample and can be found in most industries, both ocean and non-ocean related

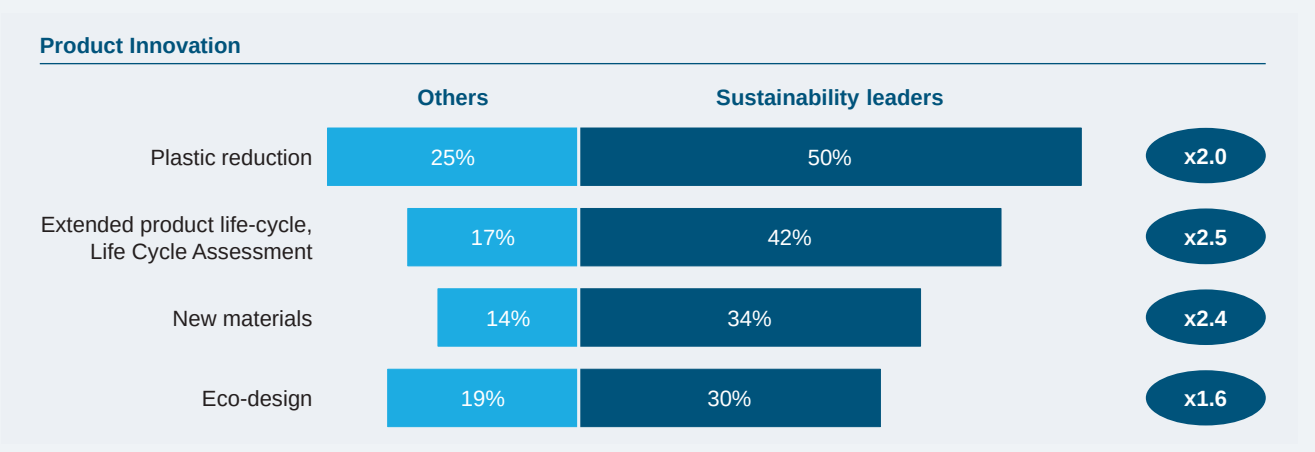
SUSTAINABILITY LEADERS ARE MORE AWARE OF OCEAN-RELATED ISSUES AND MORE ACTIVE TO MITIGATE THEIR PRESSURES ON MARINE AND COASTAL ECOSYSTEMS IN COMPARISON TO OTHER COMPANIES. THEY ALSO SHOW A BROADER COMMITMENT TOWARDS ESG TOPICS

Sustainability leaders are those companies that are more aware of ocean-related issues and more active to mitigate their pressures on marine and coastal ecosystems in comparison to other companies. Leaders represent 26% of the sample and are present in almost all sectors. According to our analysis, attention to ocean preservation is consistent with a broader commitment towards environmental, social and governance (ESG) topics and is deployed in a wide range of activities, from product and process innovations to supply chain management.

Sustainability leaders reveal a superior attitude towards product innovation for sustainability

Sustainability leaders are more likely than other companies to develop sustainable product innovations. Firstly, they show a better attitude towards eco-design, which is the inclusion of ecological, health and safety features into the design performance of a product or a service over its full life cycle: from raw materials to the end of life. In our case, this means both reducing the environmental impacts of the product (e.g. reducing or eliminating plastic and chemical components or prioritizing renewable materials such as paper sourced from sustainably managed forests) and favoring product maintenance, reuse, recycling, or renewal (e.g. developing easy-to-disassemble components or designing multipurpose products). Indeed, leaders are approximately twice as likely as other companies to use new, more sustainable materials, such as bioplastics or other biomaterials, and they are more likely to use tools such as

FIGURE 16 – TOP SUSTAINABLE PRODUCT INNOVATIONS UNDERTAKEN BY COMPANIES – SUSTAINABILITY LEADERS VS OTHERS



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

Life Cycle Assessment and to embrace the principles of Extended Producer Responsibility. Moreover, they are more responsive in developing solutions aimed at extending the life cycles of their products, such as using fewer and longer-lasting materials.

Sustainability leaders reveal a better attitude towards process innovation for sustainability

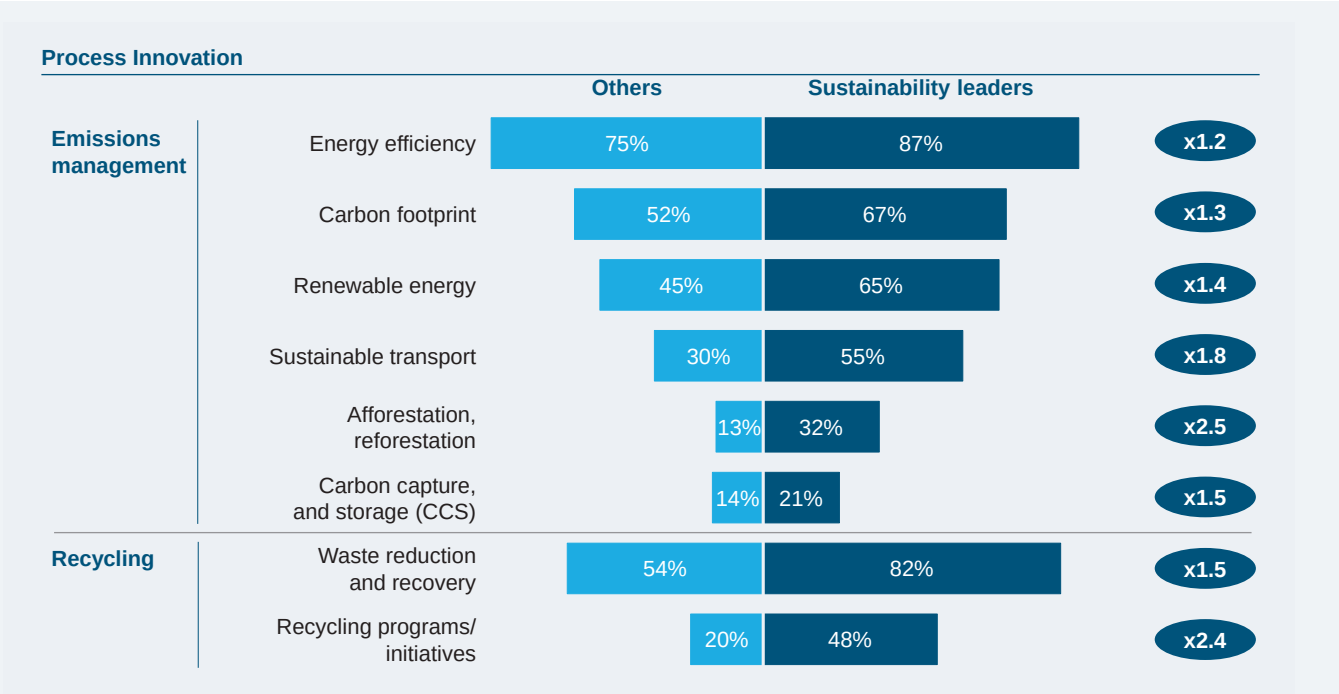
SUSTAINABILITY LEADERS ARE MORE CONCERNED THAN OTHER COMPANIES ABOUT THEIR BUSINESS RESPONSIBILITIES, INCLUDING WITH RESPECT TO THOSE ACTIVITIES THAT ARE OUTSIDE THEIR SPAN OF CONTROL

Sustainability leaders' activation also occurs through initiatives aimed at lowering the environmental impacts of their production processes. In particular, emissions management, through adoption of cleaner technologies and managerial procedures, can prevent the release of pollutants and ocean acidification. Likewise, the adoption of circular approaches and efficient recycling systems can reduce ocean pollution.

In particular, leaders and less aware companies are relatively close when it comes to assessing their carbon footprint or adopting energy efficiency measures, but the gap widens in relation to the development or adoption of renewable energy sources and to afforestation or reforestation initiatives. Carbon capture and storage technologies and sustainable transport are cross-sector solutions that sustainability leaders look at to cut emissions.

When we consider circular solutions and waste reduction, leaders are also twice as likely as other companies to recycle or upcycle their products and are more active in collecting and reducing their waste. More specifically, leaders operating in direct contact with marine and coastal ecosystems are

FIGURE 17 – TOP SUSTAINABLE PROCESS INNOVATIONS UNDERTAKEN BY COMPANIES – SUSTAINABILITY LEADERS VS OTHERS



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

developing solutions for marine litter collection and recovery as well as prevention technologies and procedures, monitoring technologies for pollution and debris tracking, new materials for absorption of pollution and contaminants, advanced wastewater treatments or decommissioning procedures aimed at minimizing the dispersion of waste materials in the ocean.

Sustainability leaders reveal a better attitude towards sustainable management of their supply chain

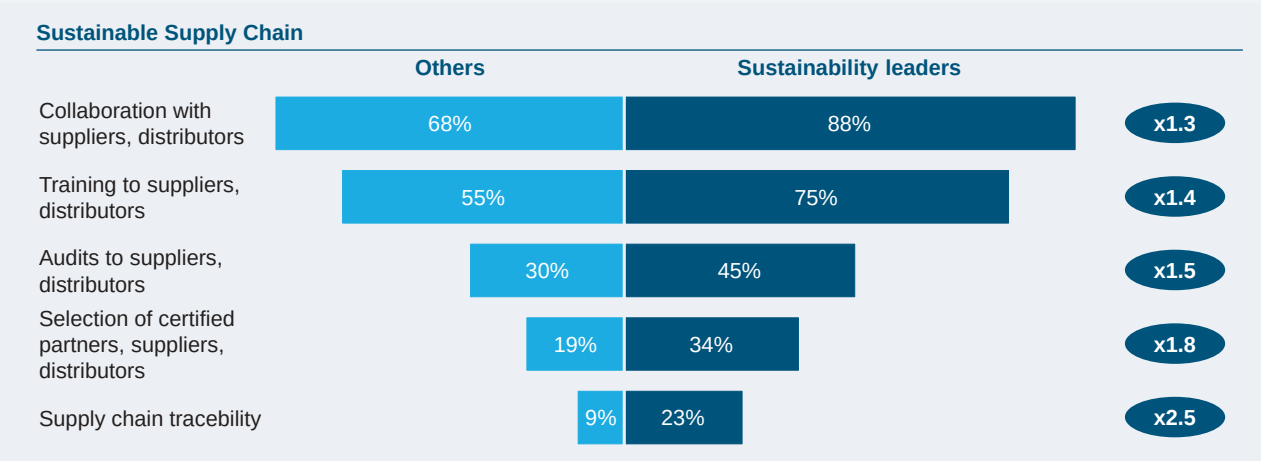
Sustainability leaders appear to be more concerned than other companies about their business responsibilities with respect not only to those activities that are directly managed, but also to those outside their span of control. Our findings show that they commit to sustainably managing their supply chain through a number of practices and that they outperform the other companies on all our metrics.

Firstly, sustainability leaders are more likely than other companies to select partners, suppliers or distributors that adopt sustainability certifications or performance standards, favoring those with a strong ethical profile.

Secondly, and accordingly, they monitor their activities through internal or external audits of their suppliers or distributors 1.5 times more than other companies. Sustainability leaders are also more than twice as likely to build traceability of their materials to ensure that sustainable practices are respected along the entire supply chain.

All these activities imply a close dialogue with suppliers and distributors. Indeed, more than 2/3 of leaders engage and collaborate with their upstream and downstream partner companies (e.g. developing integrated collaboration with regard to returnable products), offer them training programs, and share sustainability best practices with them.

FIGURE 18 – TOP SUSTAINABLE ACTIVITIES UNDERTAKEN BY COMPANIES TO MAKE THEIR SUPPLY CHAIN SUSTAINABLE – SUSTAINABILITY LEADERS VS OTHERS

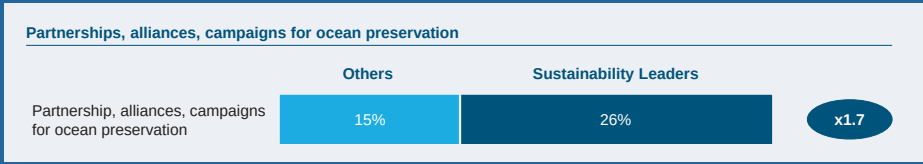


Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports from Datamaran and other databases

A limited number of companies collaborate with relevant stakeholders on ocean protection

Sustainability partnerships have become key mechanisms to address global and local environmental and social challenges: they provide channels to access specific knowledge and competencies, they help build reputation and legitimacy, they are a lever for successful business. Our findings show that 18% of companies promote or join partnerships or alliances for ocean protection. Sustainability leaders, in accordance with their higher propensity for collaboration, perform better than other companies, with 26% of them taking part in these types of organizational instruments.

FIGURE 19 – TOP SUSTAINABLE ACTIVITIES UNDERTAKEN BY COMPANIES TO MAKE THEIR SUPPLY CHAIN SUSTAINABLE – SUSTAINABILITY LEADERS VS OTHERS



Source: Natural Language Processing and lexicometry methodologies on a sample of 626 individual companies' sustainability reports

Nonetheless, most of the time partnerships and alliances for the ocean are not related to sector-specific pressures on marine and coastal ecosystems. While companies from all sectors are involved in collaborations, the majority of these initiatives are intended to reduce ocean debris and, in particular, plastic pollution, confirming the importance of public debate to the awareness and activation of companies. Instead, only a limited number of leaders establish partnerships with other objectives, such as marine and coastal ecosystems restoration, seabed preservation or protection of biodiversity.

We know that partnerships are useful tools in enabling a constructive dialogue among stakeholders, they can help in identifying opportunities for creating value, and in sharing virtuous practices. Plastic pollution related initiatives, for example, promote clean-up events for employees and customers, the development of alternative and less polluting materials, products and packaging design to reduce plastic components and multi-stakeholder collaborations to build efficient recycling systems (involving non-profit organizations, NGOs, government agencies, employees and customers).

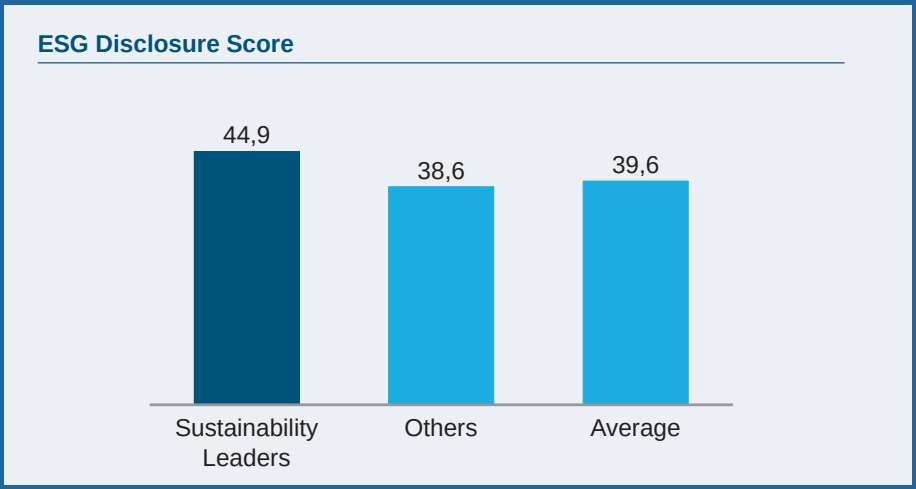
Most commonly, companies join already existing international multi-stakeholder partnerships, promoted by international non-profit organizations on the most publicized issues. Conversely, a limited number of companies develop autonomous projects, collaborating with scientific communities, peers or suppliers on company- or sector-specific problems. Large international initiatives help companies to coordinate their efforts towards environmental objectives more efficiently and are more likely to improve their reputation with respect to sustainability, but company-level collaborations are still needed to tackle sector-specific, less publicized problems.

Companies that are more mature in ESG sustainability also pay attention to ocean issues

Sustainability leaders, on average, have a higher Bloomberg ESG Disclosures Score, suggesting that companies with greater maturity in sustainability are also more likely to pay attention to ocean issues. The Bloomberg ESG Disclosure Score considers the amount of ESG data a company reports publicly, on topics ranging from air quality and water & energy management to materials & waste, from human capital to diversity, from board independence to shareholders' rights. Thus, the higher average score assessed for sustainability leaders confirms their commitment to a broad concept of sustainability and, within it, to those specific activities that benefit ocean health.

The idea that ocean conservation is pursued by companies that are already engaged in other sustainability areas holds true in particular for companies outside of the ocean economy sectors. Indeed, this category has the highest average ESG score (45). Leaders from ocean economy sectors, meanwhile, have a lower average ESG score, suggesting that companies that work in direct contact with the ocean develop a greater focus on its preservation than on other dimensions of sustainability.

FIGURE 20 – AVERAGE ESG DISCLOSURE SCORE – SUSTAINABILITY LEADERS VS OTHER COMPANIES IN THE SAMPLE VS BLOOMBERG ESG DISCLOSURE SCORE AVERAGE



Source: Bloomberg ESG Database, sample of 626 companies ESG Database, sample of 626 companies

CHAPTER 5 – ACTIVATION BOOST: SUPPLY CHAIN INITIATIVES CAN TRIGGER ACTIONS IN FAVOR OF THE OCEAN

As companies strive to operate in a more responsible manner, sustainable supply chain management has become a business imperative. This means seeking improvement opportunities across all company processes, including through close collaboration with suppliers

In this section of our report, after the examination of ocean sustainability leaders' responses, the focus moves to analysis of a broad set of best practices related to supply chain management. We know that a lot of the pressures created by companies on marine and coastal ecosystems come from the supply chain. Adopting this perspective allows us to better understand what sustainability leaders are doing to monitor geographically dispersed networks of suppliers, and what types of partnerships they attempt to establish to develop new, cleaner technologies and innovative organizational solutions.

We have drawn on a qualitative methodology based on a thorough review of the available sustainability reports. We identified and processed a long list of initiatives in order to find concrete examples of supply chain best practices for each industry in the ocean economy. Relevant examples were also selected for companies operating in other industries which prioritized SDG 14, Life below water.

FIGURE 21 – EXAMPLES OF SUPPLY CHAIN BEST PRACTICES IN FISHERIES AND AQUACULTURE

Maritime Transportation - Some best practices

Procurement and Design

Cleaner fuels
- Mapping of possible technologies for carbon neutral shipping, including co-development of decarbonised fuel types with technology developers, researchers, investors, to decarbonize operations.
- Retrofitting and / or replacement of vessels with LNG fuelled ships

Responsible supply chain program
- Commitment to the industry specific responsible supply chain program "IMPA ACT" aimed at improving the economic, social and environmental compliance of its ship purchaser and supplier members

Increased efficiency
- Use of Ultra Large Container Vessels (ULCVs) which reduce energy requirements per container through economies of scale

Sustainable sourcing
- Sourcing sustainable seafood for on-board menu and eco detergents for cleaning of public areas
- Phasing out single use plastics and replace with eco-friendly alternatives
- Choosing innovative and sustainable containers (e.g. bamboo flooring, light-steel containers, etc.)

Operations & Logistics

Reduced speed
- Participation in speed reduction programs in specific areas to reduce noise levels and minimize impact on animal communication and coastal communities

Contribution to scientific research
- During travel, provision of monitoring assistance to research centres by equipping ships with instruments for ocean monitoring

Sustainable customer offerings (cargo ships)
- Incorporation into customer offerings of eco-responsible criteria e.g. design low-carbon transportation plans, inclusion of carbon offsetting tool

Sharing economy (cargo ships)
- Promotion of container sharing initiatives with third party suppliers to reduce carbon footprint, avoiding to ship less-than-full containers

Awareness creation (passenger ships)
- Redesigning the food experience on board to reduce food waste and create awareness amongst crew and passengers on sustainable consumption habits

Waste Management

Container end of life (cargo ships)
- Activation of a rigorous maintenance and repair process to make sure tank containers are used multiple times over many years.
- Extension of life of containers, also through retrofitting and redesigning as residences, offices, etc.
- Reuse of materials by participating in container return programs and recycling all waste materials

Wastewater treatment
- Installation of Advanced Wastewater Treatment Systems (ATWS) to treat wastewater to a very high quality
- Disinfection of purified wastewater with UV processing to avoid risk to marine life

Reduction of food discharges
- Continuous evaluation of technologies and operations to minimize the volume of food discharges at sea, for example:
  - Investment in innovative equipment to digest food waste prior to discharge at sea
  - donation of food surplus at ports

Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

More specifically, examples were mapped across three key dimensions of the supply chain: Procurement and Design, Operations and Logistics (which for Fishing and Aquaculture translates into Production and Capture), and Waste Management.

The table below provides a snapshot of best practices in the Maritime Transportation sector. Similar tables for the remaining three sectors of the ocean economy can be found in Annex IV. Our findings show that each industry is characterized by a range of innovative initiatives along the key phases of the supply chain network. These actions aim at reducing negative pressures and favor a positive contribution to marine and coastal ecosystems.

Some similarities can be noted between the four supply chains of the ocean economy.

INTERACTION AND COLLABORATION WITH SUPPLIERS ARE FUNDAMENTAL. THIS INCLUDES SOURCING RULES, CRITERIA FOR SUPPLIER SELECTION AND EDUCATION OF SUPPLIERS THROUGH THE PROVISION OF RULES AND GUIDELINES FOR SUSTAINABLE CONDUCT

Specifically, the Procurement and Design phase often involves interaction and collaboration with suppliers. This can translate into simple sourcing rules, aimed at favoring suppliers that respect sustainability guidelines and offer products with good environmental characteristics such as high durability, high recyclability, sustainable raw materials and environmental certifications. For example, companies in the Maritime Transportation industry should favor suppliers who source innovative eco-containers such as light steel containers and low consumption reefers for perishable goods which help to optimize fuel consumption and hence reduce emissions.

Interaction and collaboration with suppliers may also translate into two other practices: selection of suppliers based on sustainability characteristics, and education of suppliers through the provision of rules and guidelines aimed at reducing the environmental impact of their activities. In the Fisheries and Aquaculture industry, companies may favor suppliers if certified by the Aquaculture Stewardship Council (ASC) and Marine Stewardship Council (MSC). It is worth noting the existence of industry-wide initiatives on supply chain responsibility such as the IMPA ACT program for Maritime Transportation, aimed at improving the economic, social and environmental compliance of its ship purchaser and supplier members.

Another common practice which may fall under the Procurement and Design phase or the Operations and Logistics phase, is related to cleaner fuels. Companies should design and operate ships, trucks, cranes and any other machinery capable of minimizing fuel consumption, and prioritizing clean fuels.

This objective may be pursued through two levers: the fuel itself, and the specific characteristics of the ship.

With regards to the fuel, companies should seek to decarbonize operations by sourcing, building and retrofitting ships fueled by Liquid Natural Gas - which is considered the cleanest marine fuel available and, compared with heavy fuel oil, has significantly lower CO_2 emissions and almost nonexistent particle emissions – and electric or hybrid engines. The same is true for trucks

and cranes used in Ports and Warehousing operations. In addition, companies should invest in co-development of decarbonized fuel types with technology developers, researchers, investors, and other relevant stakeholders.

Similarly, designing and building ships with certain characteristics can contribute to the decarbonization of operations. To reduce fuel consumption at sea, companies should seek to reduce boat weight, design hulls to improve buoyancy on water, optimize bonding systems for anti-fouling paint on the gelcoat, and introduce more environmentally-responsible equipment such as solar panels. In the Maritime Transportation industry, container sharing initiatives pursue the same objective by avoiding shipment of less than full containers.

In the Operations and Logistics phase, some interesting practices related to ocean biodiversity preservation can be noted.

For example, in the Fisheries and Aquaculture sector, engaging in fishing using “active fishing gear” in the form of ring nets and trawls instead of bow nets, which can be lost, reduces the risk of ghost fishing. Also, companies should implement a policy to retrieve all lost gear.

In the Maritime Transportation sector, companies commit instead to established speed reduction programs in waters where whales are found to be present. This practice is aimed at reducing underwater noise levels which impact and confuse the communication systems of a particular type of orca whale, an endangered species. In addition, companies operating in this industry can contribute to scientific research on oceanography by deploying data-collection buoys aimed at monitoring ocean health during journeys.

The Waste Management phase also involves some issues common to multiple ocean economy sectors: plastic waste and production waste recycling.

In addition to minimizing the use of single use plastics throughout company operations, by favoring recycled and recyclable plastics, seeking alternative packaging materials and defining a plastic use policy, ocean economy companies can contribute to tackling the issue of marine debris.

Shipbuilding and Repair companies are committed to continuous analysis and cleaning of the waters surrounding the build site to detect and remove marine debris and microplastics and protect marine wildlife.

With regards to production waste, companies can maximize the recycling rate of their production waste, diverting as much waste as possible from landfill.

In the Fisheries and Aquaculture industry this can be achieved in different ways, for example by transforming dead product and guts into by-products (e.g. animal feed), transforming sludge into soil improver, and through anaerobic digestion of biomass and conversion into biogas for the production of renewable energy and fertilizers.

The same is true for the other ocean economy sectors where strategic

partnerships with recycling companies allow separation of scrap metals (aluminum, copper, iron, etc.) for reuse and recycling, and participation in container return programs after having reused them as many times as possible and extended their useful life through rigorous maintenance and repair.

THE REDUCTION OF A COMPANY'S IMPACT ON THE OCEAN THROUGH SUPPLY CHAIN OPTIMIZATION IS NOT LIMITED TO THE OCEAN ECONOMY SECTOR. COMPANIES IN EVERY SECTOR CAN SET AN EXAMPLE

In general, we have mapped several best practices for ocean sustainability with regard to managing the supply chain. These virtuous experiences should be diffused and applied by companies in the ocean economy to improve their environmental footprint and reduce their impact on marine ecosystems.

As mentioned at the beginning of this chapter, this should not be limited to the ocean economy. As a matter of fact, best practices are being implemented by companies in other sectors as well, and should set an example.

Most of the best practices illustrated in the table below, developed by companies operating in the Retail, Food & Beverage, Tourism, Chemical & Pharmaceutical, Utilities, and Electric Power Generation industries, are related to the same issues described in the previous section on the ocean economy. However, some industry peculiarities exist.

For example, Chemical and Pharmaceutical companies can pay particular attention to the issue of microplastics, ensuring that none of their consumer products contain any microbeads, by substituting them with environmentally friendly mineral ingredients, and avoiding opacifiers made from solid synthetic plastics.

FIGURE 22 – EXAMPLES OF SUPPLY CHAIN BEST PRACTICES IN OTHER INDUSTRIES, OUTSIDE THE OCEAN ECONOMY

	Non Ocean Economy Industries - Some best practices		
	Retail, food & beverage, and tourism industries	**Chemical & pharmaceutical industry**	**Utilities and electric power generation industries**
Procurement and Design	**Sustainable sourcing** ▪ Commitment to only sourcing seafood from certified sustainable fisheries and/or farms certified to standards that have been benchmarked to the Global Sustainable Seafood Initiative (GSSI) benchmarking tool	**Circular design** ▪ Commitment to the circular economy by adapting processes to re-manufacturing and recycling ▪ Designing products and solutions for longer life and reuse, minimizing leakage to oceans and the environment	**Environmental assessments** ▪ Carrying out environmental impact assessments (EIAs) to avoid placing new infrastructure in protected areas or areas with a high biodiversity value, even if not officially protected ▪ Engaging with stakeholders to identify best practices on how key species and natural habitats can be protected during construction ▪ Minimizing environmental impact and restore affected areas
Operations & Logistics	**Plastics management** ▪ Reduction of unnecessary plastic in packaging and substitution with recycled plastics or biodegradable materials ▪ Decrease in dependence on single use plastics for operations (e.g. straws, cutlery, etc.)	**Microplastics-free production** ▪ Ensuring all consumer products do not contain microplastics: – No microbeads - substitution with environmentally friendly mineral ingredients – No opacifiers made from solid synthetic plastics	**Quick emergency response** ▪ Ensuring constant emergency response readiness in order to prevent and liquidate petroleum product spills – Establishing oil spill management and response bodies – Readily holding classroom trainings, drills and emergency response exercises at different levels, also involving representatives of executive authorities
Waste Management	**Sustainable waste management** ▪ Supporting of innovations to improve waste reduction systems and increase recycling ▪ Commitment to changing consumer habit of littering by promoting awareness, enabling action (e.g. providing equipment such as ashtrays) and enforcing anti-littering laws	**Sustainable production waste treatment** ▪ Upgrading of wastewater treatment infrastructure and undertaking additional purification of wastewater from antibiotic processing before discharge into the ocean ▪ Scaling up of chemical recycling of mixed plastic waste back to chemicals or other plastics	

Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

On a different note, Utility and Electric Power Generation companies which need to build new hydroelectric infrastructures should always carry out environmental impact assessments (EIAs) to avoid placing them in protected areas or areas with a high biodiversity value, even if not officially protected. During construction, it is important to engage with stakeholders to identify best practices on how key species and natural habitats can be protected during construction, and to restore affected areas.

These are just a few examples of innovative supply chain best practices that were implemented by companies in 2019. In order for the whole industries to progress, companies' collaborative efforts with peers and stakeholders, across the supply chain, are of paramount importance.

CHAPTER 6 – TRANSPARENCY BOOST: THE NEED FOR AN OCEAN DISCLOSURE INITIATIVE

Our findings highlight a lack of reporting frameworks focused on ocean-related issues. Companies committed to ocean sustainability have very limited opportunities to report their strategies and achievements against ocean-specific targets and KPIs, which do not yet exist. However, general sustainability frameworks are already established and show widespread diffusion.

FIGURE 23 – COMPARISON BETWEEN GENERAL SUSTAINABILITY REPORTING VS OCEAN-SPECIFIC REPORTING

86%

of the companies analyzed adopt at least one **sustainability framework or standard**

0%

of the companies analyzed use an **ocean transparency framework**

Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

Transparency and disclosure are relatively widespread and provide information related to the sustainability strategies and initiatives developed by companies

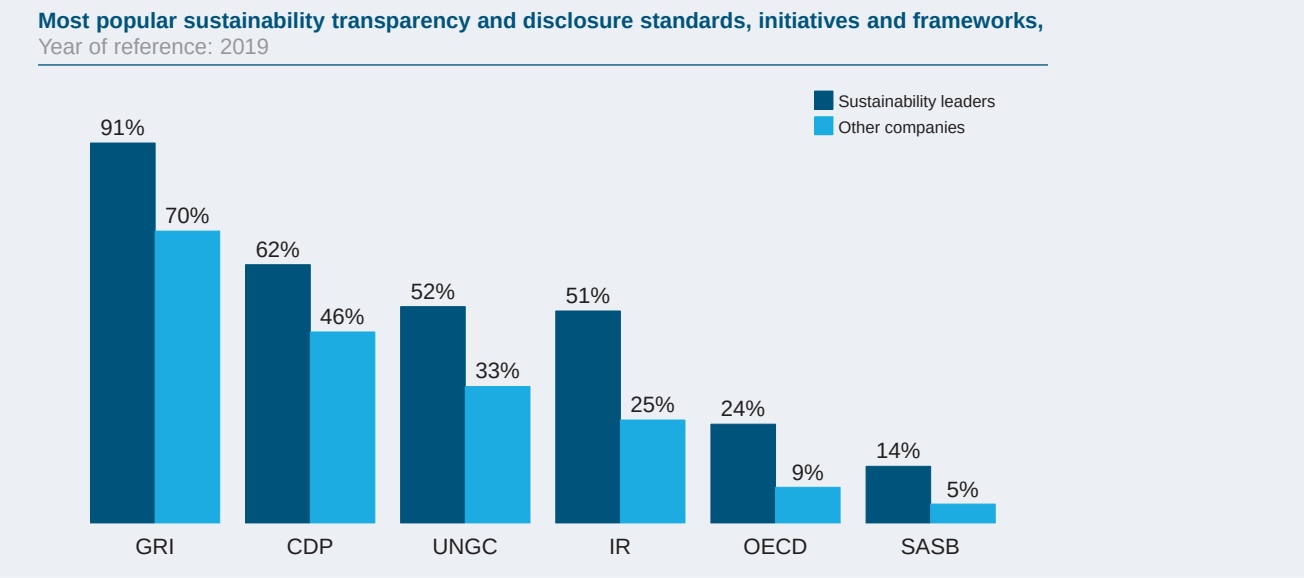
In order to map the orientation towards general as well as more issue-specific forms of transparency and disclosure, we tested how frequently companies mentioned a broad range of standards, initiatives and frameworks.

91% OF SUSTAINABILITY LEADERS, VS 70% OF OTHER COMPANIES ADOPT THE GRI STANDARDS TO REPORT INFORMATION, BEHAVIORS AND PRACTICES RELATED TO SUSTAINABILITY

According to our findings, 91% of sustainability leaders, vs 70% of other companies adopt the Global Reporting Initiative (GRI) standards to report information, behaviors and practices related to their sustainability strategies, in the area of economic, environmental and social impacts. Established in 1997, the GRI developed one of the first corporate sustainability reporting frameworks, designed to provide data and information to a wide range of stakeholders, from customers to the financial community. Today, the GRI is used by the vast majority of companies reporting on sustainability issues, being *de facto* the global standard on sustainability reporting.

Another sustainability reporting framework, the Sustainability Accounting Standards Board (SASB), is adopted by 14% of sustainability leaders. Established in 2011 with the aim of providing guidance on the disclosure of material sustainability information that is likely to impact financial performance, the SASB standards are designed to support businesses in providing investors with the most appropriate information on the financial impacts of sustainability.

FIGURE 24 – DISTRIBUTION OF MOST POPULAR TRANSPARENCY AND DISCLOSURE STANDARDS, INITIATIVES AND FRAMEWORKS ACROSS NON-FINANCIAL REPORTS



Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability reports

In the last decade an additional reporting framework has emerged. Figures show that 51% of sustainability leaders vs 25% of other companies adopt the Integrated Reporting (<IR>) scheme, i.e. the framework launched in 2010 by the International Integrated Reporting Council (IIRC), aimed at integrating the economic, financial and sustainability information related to companies' activities in one document. With respect to the two previous initiatives, the <IR> framework does not prescribe specific key performance indicators (KPIs), measurement methods or the disclosure of individual matters, which are left to the responsibility of the reporting organizations.

When it comes to issue-specific disclosure, 62% of leaders declare to refer to the CDP (formerly Carbon Disclosure Project) when it comes to carbon emission management and the impacts of business operations on climate change. Established in 2002, since then over 8,400 companies each year publicly disclose their contribution to climate change mitigation adopting the CDP standards. As additional guidance, CDP more recently added other specific reporting frameworks aimed at supporting companies in disclosing information about sustainable forest and water security management and supply chains.

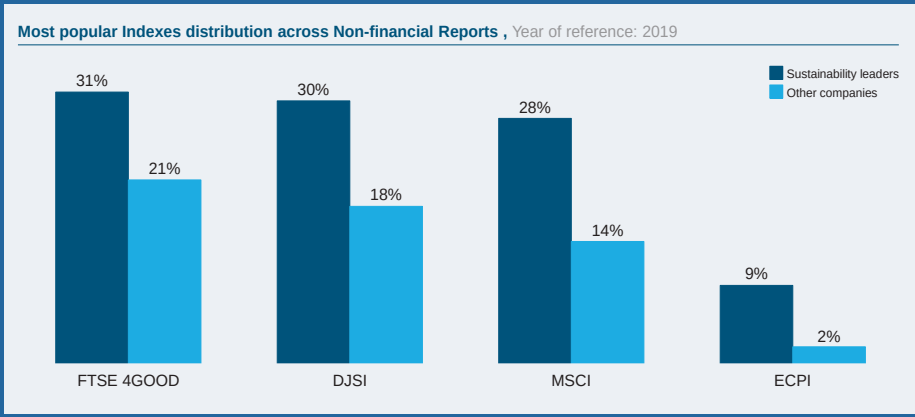
One of the most important international initiatives in the field of sustainability is represented by the UN Global Compact (UNGC) principles which relate to human rights, labor practices, the environment and anti-corruption. This framework was launched in year 2000 and it is now endorsed by more than 9,500 companies based in over 160 countries. 52% of sustainability leaders - vs 33% of other companies - declare to have adopted the initiative.

Finally, 24% of sustainability leaders refer to the OECD Guidelines for MNEs. This global approach was launched in 1976 and has been reviewed several times; it reflects government expectations on how businesses should act responsibly. These guidelines cover all key areas of business responsibility, including human rights, labor rights, the environment, bribery, consumer interests, as well as information disclosure, science and technology, competition, and taxation.

As additional evidence of their commitment to the sustainability agenda, companies refer to their inclusion in ESG indexes

Whenever included in ESG indexes, companies mention this result in their sustainability reports as additional evidence of their commitment to the sustainability agenda. Our figures show that 31% of sustainability leaders declare being included in the FTSE4GOOD index family, 30% in the DJSI and 28% in the MSCI.

FIGURE 25 – MOST POPULAR ESG INDEXES MENTIONED BY THE COMPANIES IN THE SAMPLE



Source: Authors' elaborations from Datamaran Database; sample: 1,664 individual companies' sustainability eports

DUE TO THE LACK OF OCEAN-FOCUSED REPORTING FRAMEWORKS, COMPANIES COMMITTED TO OCEAN SUSTAINABILITY VOLUNTARILY SET SELF-DEFINED OCEAN-SPECIFIC TARGETS AND INDICATORS IN ORDER TO REPORT AGAINST THEM

None of these standards, initiatives, frameworks or ESG indexes are specifically designed to provide focused support or guidance on ocean-related transparency and disclosure. Therefore, companies willing to report on these issues are forced to elaborate and adopt self-defined targets and indicators

Despite the growing relevance of ocean-related issues, and the importance of preserving marine and coastal ecosystems, our analysis confirmed that none of the standards, initiatives, frameworks or ESG indexes are specifically designed to provide any comprehensive support in guiding the assessment and reporting of business pressures on marine ecosystems.

Despite this lack of focus, a few of the companies most committed to ocean issues voluntarily set ocean-specific targets and indicators in order to report against them.

Some examples relate to operations in protected marine areas (e.g. the number of days of operation in marine reserves or sanctuaries), the prevention of spills and release of harmful substances into the marine environment, the support provided to scientific research (e.g. the number of days spent by vessels supporting scientific sampling for ocean biodiversity), or the adoption of responsible procurement in the fishing sector (e.g. the % of fish farmed or fished responsibly), as well as to the implementation of sustainable and traceable feed techniques (e.g. the % of traceable feed in raw materials, or the carbon footprint of feed materials).

Additional targets or indicators relate to the reduction of single use plastics or the increased use of recycled plastic materials in products and packaging, the adoption of advanced waste and wastewater management techniques, or the support or sponsorship of marine biodiversity projects.

FIGURE 26 – EXAMPLES OF OCEAN-RELATED TARGETS AND INDICATORS

Marine protected areas	Spills	Scientific support	Responsible procurement
Maritime Transportation	**Maritime Transportation**	**Maritime Transportation**	**Fishing and Aquaculture**
Shipping duration in marine protected areas (number of travel days)	Number of spills and releases to the environment	Number of days spent by vessels supporting scientific research	% of fish farmed / fished responsibly according to international standards

Sustainable feed	Plastics	Waste and wastewater	Biodiversity projects
Fishing and Aquaculture	**All Blue Economy**	**All Blue Economy**	**All Blue Economy**
% of traceable feed raw materials	% of recycled plastic in products and packaging	% of recycled waste and waste to landfill	Number of biodiversity projects supported / sponsored
Carbon footprint of feed raw materials	Number of single use plastic items used	Volume of contaminants in wastewater	

Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

Although these examples refer to ocean economy sectors, some additional attempts to report by non-ocean related companies regarding their (indirect) pressures on marine ecosystems have been identified, although not formalized in terms of targets or indicators. We refer, for example, to companies that formally acknowledge the indirect link between their GHG emissions and the acidification of the ocean (e.g. some practices were found in the food and beverage or in the agriculture sector), or to the assessment, by a limited number of textile and apparel companies, of the issues related to microfibers released into wastewater effluents due to washing of clothes.

Our findings suggest that greater awareness and activation can be boosted through new and dedicated initiatives aimed at promoting the disclosure of data regarding business pressures on marine ecosystems

THE STANDARDIZATION OF METRICS AND INDICATORS WOULD BE USEFUL TO SUPPORT COMPANIES IN ADDRESSING AND MITIGATING THEIR MOST RELEVANT DIRECT AND INDIRECT PRESSURES

Similarly to the initiatives developed to tackle climate change, new instruments designed to support the reporting of pressures on the ocean and business mitigation initiatives would match companies' growing needs for transparency and disclosure, as well as the requests coming from stakeholders such as investors, consumers, and NGOs.

Additionally, a process of standardization of metrics and indicators aimed at measuring and assessing ocean pressures through the development of specific guidelines would be useful to support companies in addressing and mitigating their most relevant direct and indirect pressures.

Such initiatives would measure organizations' pressures on marine and coastal ecosystems, gathering data to facilitate the understanding of key performance information, while providing the interested stakeholders, including the financial community, with additional insights to evaluate the ocean-related sustainability profile of companies and the associated risks.

In order to achieve these objectives, a new initiative dedicated to standardizing a set of transparent, material, robust and reliable indicators and to disclosing and sharing corporate information about ocean sustainability strategies is envisaged. Drawing from previous experiences focused on the attempt to address other sustainability issues (e.g. climate change, biodiversity, etc.) a successful proposal should be framed around the following pillars:

- **Ocean-focused**, in order to fill the gap in terms of availability of guidance, standardized metrics and indicators related to the reporting of pressures on marine ecosystems, as well as on the actions adopted to mitigate such pressures
- **Science-based**, to promote the collection and reporting of the relevant data and information, based on scientific evidence and related to the real possibility of improving the Good Environmental Status of ocean ecosystems
- **Comprehensive,** in the sense that it must consider not only the direct pressures exerted on marine and coastal ecosystems, but also the indirect ones, most of which are of land-based origin
- **Multi-stakeholder and open to the contribution** of the first adopters - i.e. the business community, as well as of the main stakeholder groups, e.g. the financial community, academia and research centers, governments, NGOs, civil society, consumers' associations

- **Consistent with a sustainability risk management approach**, already embraced by leading finance institutions within the general ESG perspective, intended to highlight both risks and benefits related to sound ocean sustainability initiatives
- **Compatible with existing initiatives**, as the main objective would not be the development of an additional and competing standard, but to complement the missing elements relating to ocean conservation

The collection of ocean-based business data and information will help to identify and select ocean leaders, those virtuous companies that have taken steps in managing and reporting their practices on marine ecosystems sustainability. The ultimate goal being the introduction of the Ocean Disclosure Index, which will focus on responding to the needs of investors, in order to underpin robust ESG analysis and facilitate the inclusion of ocean risks in their investment decisions.

NEXT STEPS AND BEYOND

Through a broad and thorough exam of the sustainability reports of global companies, coupled with an innovative review by expert scientists, Business for Ocean Sustainability provides a landmark description of the level of business awareness and response concerning the many direct and indirect pressures exerted on the ocean.

The global perspective adopted by this second edition confirms the main findings of the previous study. Sustainability leaders exist; they are more aware and they have developed strategies, innovation and supply chain practices to mitigate their pressures on the ocean. However, the vast majority of companies are locked-in, either because they are not aware of marine ecosystem problems, or because they are unable to respond through coherent and effective mitigation actions.

The challenge of ocean sustainability has just begun. It is complex and intertwined with the other great challenges of our century: climate change, biodiversity loss, but also poverty, hunger, equality and health. The 2030 Agenda and the SDGs call for worldwide action and contribute to providing the overarching framework to shape and orient business responses.

But we are running out of time.

We can learn a lot from the climate crisis that started almost 30 years ago (the UNFCCC was established in 1992, the Kyoto Protocol dates back to 1997), both in terms of failures and successes. We must rely more on the centrality of business, as business has the knowledge, the competencies and the financial resources.

First, businesses must recognize that maintaining a healthy ocean is vital for long-term operations in all industries, not only in ocean-related ones. Companies must acknowledge their interdependence with social-ecological systems, and that resilient marine and costal ecosystems are as necessary to business as they are to humans and other species. We believe that businesses must play a leading role in ensuring ocean health and the maintenance of ecosystem services. Sustainable solutions come from the development of clean technologies, innovative products and services, and new and sustainable business models.

Companies must contribute to defining the governance and to setting forth the rules we need to address sustainability (e.g. soft-regulatory systems and standards); they must engage in dialogue and cooperate with NGOs, governments and agencies to develop innovative solutions and gain legitimacy; they must question the prevailing models of value creation, and start contributing positively to society and the environment, instead of minimizing the negative impacts.

We must immediately engage the world of finance, which today shares greater maturity and attention to ESG issues, and which is becoming an agent of change. But we also need to develop a new “language” that transforms the “pressures” into standardized and reliable metrics and KPIs, functional to assessing the “risks” related to ocean sustainability, as well as measuring “returns” linked to the adoption of superior sustainability practices.

We must also build a bridge between ocean sciences and business: in order to avoid excluding this world, companies must be supported and accompanied in addressing and mitigating their most relevant direct and indirect pressures.

The OOF is in the right position to facilitate the path towards the creation of an open multi-stakeholder platform, favoring dialogue between the parties, and connecting business and finance, science, civil society and governments. The idea is to establish a taskforce to proceed with the creation of a system of standard guidelines and metrics (KPIs) on transparent, material, reliable and shared ocean sustainability, and to facilitate the relationship between the corporate world and finance.

The goal is to create an Ocean Disclosure Index to support decision-making, enhance responsible and sustainable value creation processes, and contribute to the conservation of the ocean.

The ocean provides irreplaceable benefits, securing a major contribution to our social and economic development and well-being. The challenges are many and complex, as discussed throughout the report, but the hope is that ocean sustainability can be mainstreamed and concretely pursued with the immediate and effective mobilization of the many interested parties.

ACKNOWLEDGEMENTS

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GLOSSARY

Acidification – Reduction in the pH (i.e. increase in acidity) of ocean waters over an extended period of time, caused primarily by the uptake of carbon dioxide (CO_2) from the atmosphere.

Biofuel – Any fuel (gaseous, liquid, or solid) derived from natural sources such as plants, algae or waste (biomass). Biofuels represent a renewable alternative to fossil fuels.

Bioplastic – A plastic material that is either bio-based (i.e. derived from vegetal feedstocks such as corn, sugarcane or cellulose), biodegradable (i.e. the material can be converted into natural substances such as water, CO_2, and compost, by microorganisms existing in the environment, without artificial additives), or presents both properties.

Blue bond – Financial instrument aimed at financing specifically ocean-friendly projects.

Blue or ocean economy – Economic sectors whose activities take place in marine and/or coastal environments.

Carbon Capture Utilization and Storage (CCUS) – Technologies aimed at capturing carbon dioxide (CO_2) from fuel combustion or industrial processes, transporting it via ship or pipeline, and either using it as a resource to create products or services or permanently storing it underground

Contaminant – Substances (i.e. chemical elements and compounds) or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern.

Ecosystem services – The Millennium Ecosystem Assessment defined ecosystem services as “the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling”.

Eutrophication – The process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen.

Food web – A system of interlocking and interdependent food chains.

Fuel cell – Electrochemical cell that converts the chemical energy of a fuel (e.g. hydrogen) and an oxidizing agent (e.g. oxygen) into electricity through chemical reactions.

GDP – Gross Domestic Product. Total value of goods produced and services provided in a country during one year.

GVA – Gross Value Added. The difference between total industry GVA and total GDP is taxes less subsidies on products, which varies across countries. This adjustment is made at the aggregate (total economy) level because, while time series of taxes less subsidies on products may be available by product, they are not generally available by industry.

Greenhouse Gas (GHG) – Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. The primary greenhouse gases in the Earth's atmosphere are water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3).

Hydrographical conditions – The physical parameters of seawater, such as temperature, salinity, depth, currents, waves, turbulence, turbidity.

Impact investing – Socially responsible investment strategy focused on generating a social-environmental impact compatible with a medium-long term economic return.

Liquid Natural Gas – Natural gas (primarily methane) that has been liquefied at atmospheric pressure by reducing its temperature in order to facilitate its safe storage and transport.

NGO – Non-governmental organization.

Non-indigenous species – Species introduced outside their natural past or present range, which may survive and subsequently reproduce, threatening the biodiversity of an ecosystem.

Overfishing – The uncontrolled catch of fish in a water course or a sea area, destined to irreparably compromise its reproductive capacity.

PBAT – Polybutylene adipate terephthalate, a biodegradable type of plastic derived from fossil raw materials.

PBS – Polybutylene succinate, a biodegradable type of bio-based plastic.

PE – Polyethylene, a non-biodegradable type of plastic.

PET – Polyethylene terephthalate, a non-biodegradable type of plastic.

PHA – Polyhydroxyalkanoate, a biodegradable type of bio-based plastic.

PLA – Polylactic acid, a biodegradable type of bio-based plastic.

PP – Polypropylene, a non-biodegradable type of plastic.

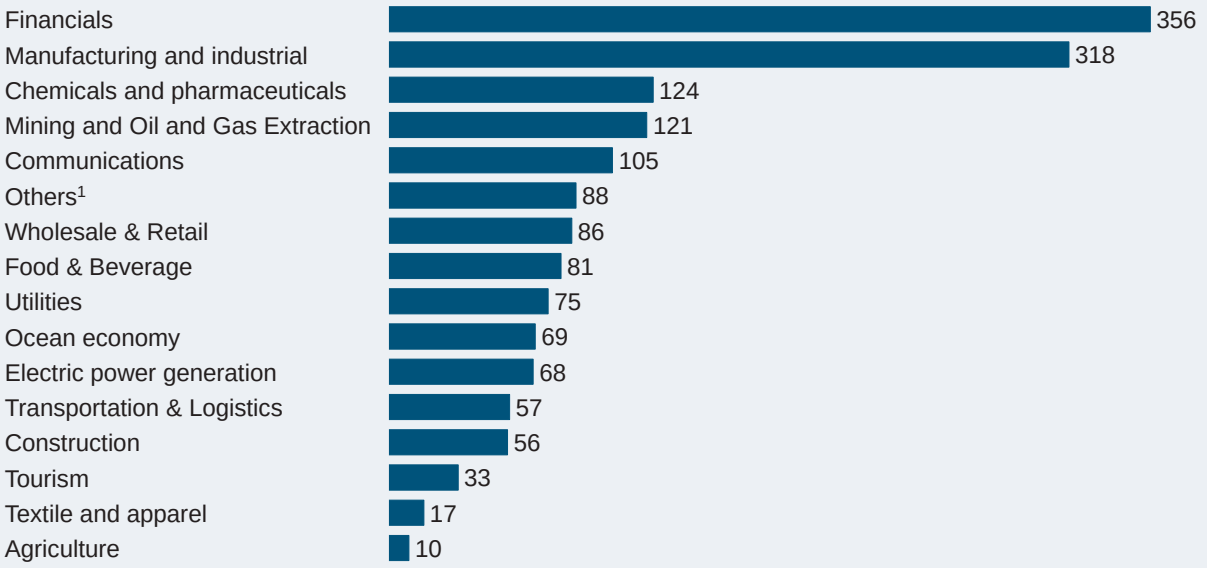
Pressure – Any action that makes a change to the state of the natural environment whether adverse or beneficial, wholly or partially resulting from the activity of an organization, or the utilization of products or services.

ANNEX I – DESCRIPTION OF THE SAMPLE

This research analyzes the sustainability reports published in 2019 by a sample of 1,664 companies, among the world's largest by market capitalization. The sample is made up of companies belonging to 16 industrial sectors, including 69 organizations from ocean economy sectors (i.e. fishing and aquaculture, maritime transportation, shipbuilding and repair, ports and warehousing).

In terms of economic dimensions, the sample represents companies with a total market capitalization of almost $45 trillion, accounting for more than 50% of the world's market capitalization.

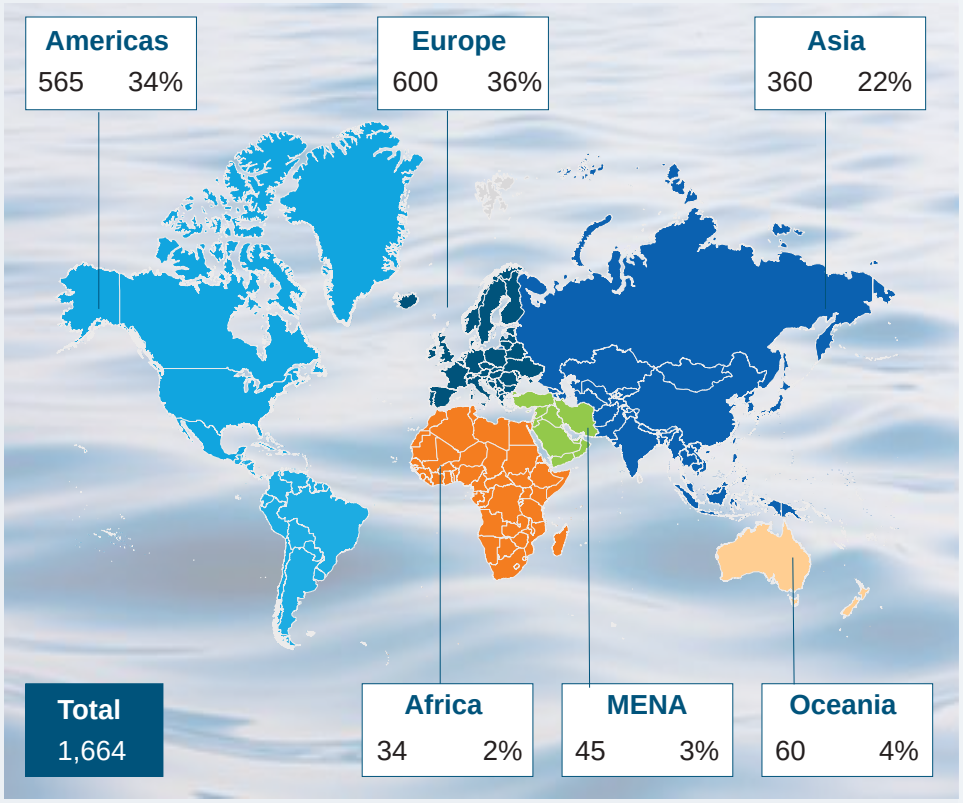
Sectors distribution
Number of companies



1. The category "Others" that comprises companies working in services sector such as Internet Software and Services, IT services, and Miscellaneous Consumer Services

As regards geographical distribution, the sample covers all the continents and mainly comprises European (36%) and American (34%) companies. The remaining 30% is represented by companies located in Asia (22%), Oceania (4%), Middle East and North Africa (3%) and Africa (2%).

Geographic distribution
Number of companies



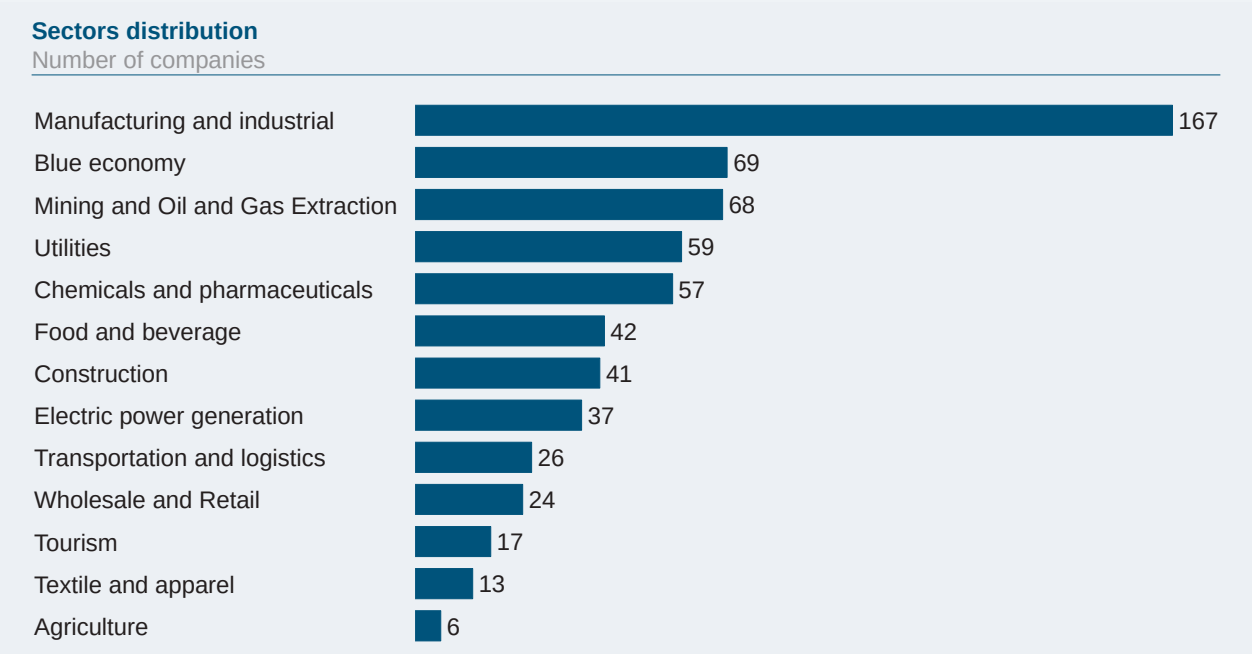
Definition of industry sectors

Sector	Definition
Agriculture	Economic activities related to soil cultivation, crop production, forest management, raising livestock (except living marine organisms), and in varying degrees to the preparation and marketing of the resulting products
Chemical and pharmaceutical	Economic activities related to the basic preparations of chemicals, resins, synthetic rubber and fibers, pesticides, fertilizers, paints, coatings, adhesives, soaps, cleaning compounds and toiletries, and pharmaceutical and medicine manufacturing
Communications	Economic activities related to publishing and broadcasting (except internet), telecommunications, producing motion picture and sound recordings
Construction	Economic activities related to the construction of buildings, utility systems, highways, streets, bridges and other heavy civil engineering
Electric power generation	Economic activities related to the use of fossil fuels (e.g. coal, oil, or gas) and renewable sources (e.g. hydroelectric, solar, wind) to produce electric energy
Financials	Economic activities related to finance and insurance, meaning the creation, liquidation, or change in ownership of financial assets and/or facilitating financial transactions
Fishing and Aquaculture	Economic activities related to catching and farmed production of living marine organisms for both food and non-food purposes
Food and beverage	Economic activities related to food raw materials processing, packaging and distribution. This includes fresh, prepared foods as well as packaged foods, and alcoholic and nonalcoholic beverages. This sector includes tobacco products manufacturing
Manufacturing and industrial	Economic activities related to traditional manufacturing (e.g. paper, wood, rubber, plastic, leather products etc.) and to the production of industrial components and systems)

Mining and oil and gas extraction	Economic activities related to the extraction of naturally occurring mineral solids (e.g. coal and ore), liquid minerals (e.g. crude petroleum) and gases (e.g. natural gas); and beneficiating (e.g. crushing, screening, washing and flotation) and other preparation at the mine site, or as part of mining activities
Ports and warehousing	Economic activities related to the operation and management of ports, such as storage, loading and unloading activities and cargo handling
Shipbuilding and repair	Economic activities related to the manufacturing, repair and maintenance of ships, boats, offshore platforms and offshore supply vessels
Textiles and apparel	Economic activities related to the production of textiles and fabrics from basic fibers and to the transformation of these fabrics into clothing and other accessories
Tourism	Economic activities related to hotels and motels, other traveler accommodations, food and drink service establishments
Transportation and logistic	Economic activities related to providing transportation of passengers and cargo, warehousing and storing goods, scenic and sightseeing transportation, and to supporting these activities
Utilities	Economic activities including energy transmission and distribution, water supply, sewage and waste management
Water transportation	Economic activities related to water transportation of passengers and cargo using watercraft, such as ships, barges and boats, and scenic and sightseeing water transportation
Wholesale and Retail	Economic activities that intermediate the sale of goods or services to retailers or to customers through multiple channels of distribution

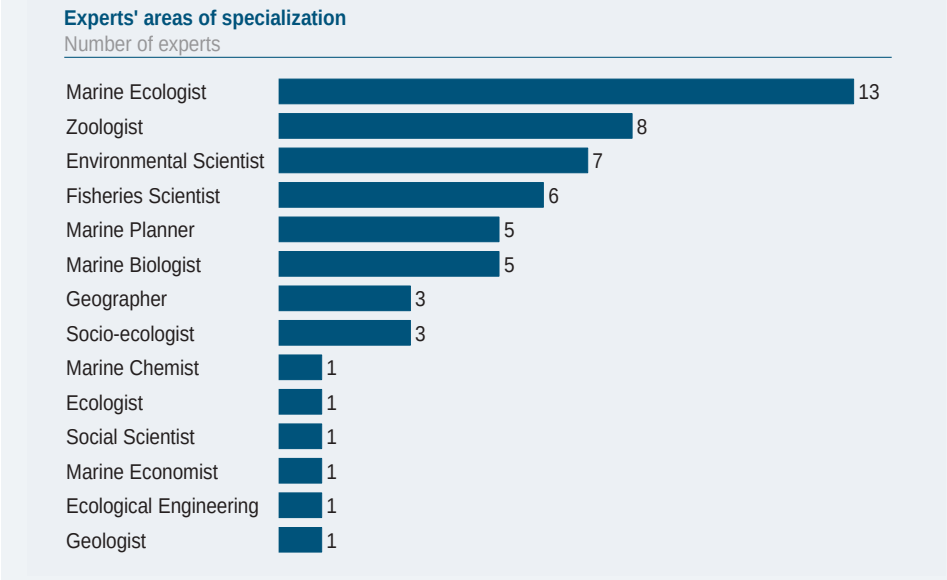
The sample of 1,664 companies was used to conduct, through Natural Language Processing and lexicometry, the analysis on SDGs (Chapter 2) and the analysis on the distribution of the most popular transparency and disclosure standards, initiatives and frameworks across Non-financial Reports (Chapter 6).

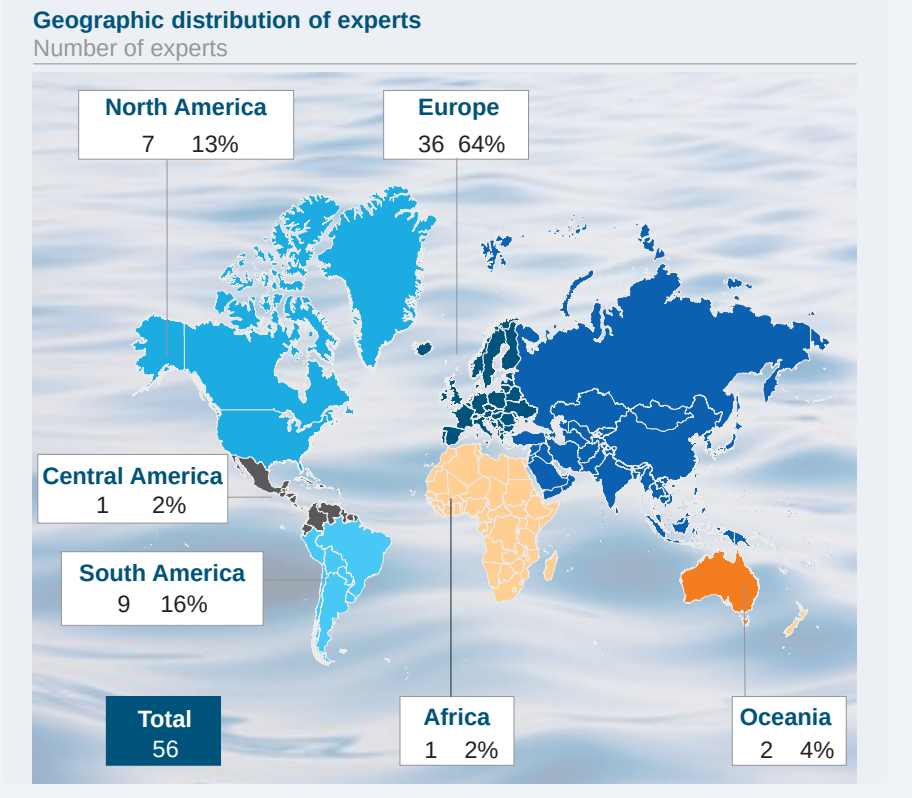
A sample of 626 companies was considered to perform awareness and activation analysis (Chapters 3 and 4). The firms were classified in 13 industries and represent a total market capitalization of $15 trillion, accounting for more than 17% of the world's market capitalization.



ANNEX II – PANEL OF SCHOLARS AND EXPERTS

The science-based analysis of the sectors' direct and indirect pressures on ocean health was broadened with respect to last year's report. A panel of 56 multi-disciplinary and international experts was involved.





ANNEX III – ECONOMIC ANALYSIS: METHODS AND SOURCES

This report, in line with the definitions adopted by the OECD and the World Bank, examines the economic value of the global ocean economy's established and emerging sectors (those for which reliable data is emerging) and provides a characterization of the different ocean basins through their socioeconomic features, such as GDP and employment.

The established sectors are coastal tourism, aquaculture and fishing, offshore oil and gas, water transport, ports and warehousing and shipbuilding and repair. The emerging sectors are genetic and medical resources, seabed mining, desalination and marine renewable energy.

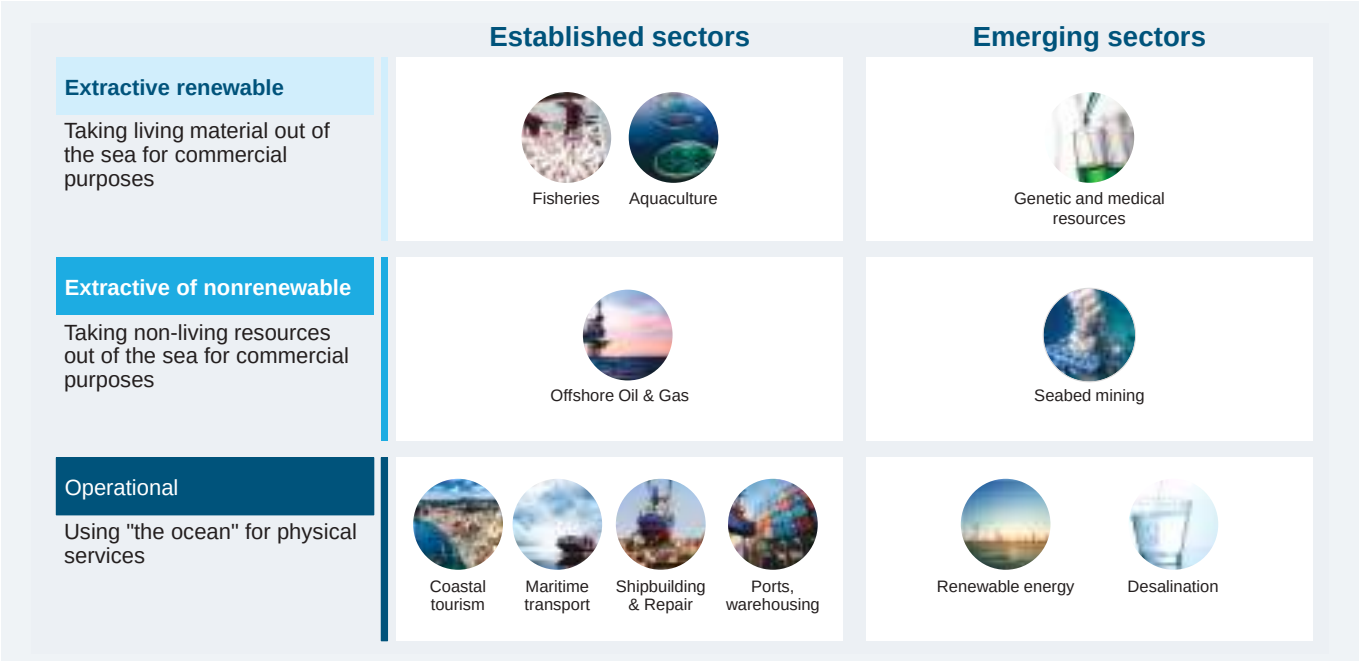
The sectors are categorized in three main groups:

I. "Extractive renewable": sectors whose returns are linked to the living "renewable" resources of the oceans[1] (such as fisheries, aquaculture and genetic and medical resources)

II. "Extractive non-renewable": sectors that are related to non-living and therefore "non-renewable" resources (including offshore oil and gas and seabed mining)

III. "Operational" which includes coastal tourism, water transport, shipbuilding and repair, ports and warehousing as established sectors and desalination and marine renewable energy as emerging sectors

DESCRIPTION OF THE OCEAN ECONOMY SECTORS



1 "The potential of blue economy", World Bank Group and United Nations, 2017

A “bottom-up” analysis was conducted to estimate the annual economic value generated by each ocean economy sector. For this purpose, international, regional and occasionally country statistical data were consulted to collect the most recent available data (reference year 2017). Multiple publicly available sources, such as national and regional reports, articles from the specialist press and industrial data were leveraged and triangulated to arrive at a fair and estimated amount for each industry. The availability and quality of socioeconomic data differs between regions and countries and the results of the economic assessment were based on a number of estimates and assumptions, in order to illustrate orders of magnitude of the economic activities assessed, in terms of turnover, value added and employment.

The geographical scope of the present report is the World Ocean which is divided in a number of principal oceanic areas that are delimited by the continents and various oceanographic features: these divisions are the Atlantic Ocean, Arctic Ocean, Indian Ocean, Pacific Ocean and Southern Ocean as defined by the International Hydrographic Organization (IHO). It should be noted that most of the socioeconomic data are currently collected and available at national level, sometimes at regional and sub-regional level. Some countries and regions border more than one ocean, therefore, the value of each of the five oceans was estimated by means of ratios based on coastal length. Data on coastal length by country were collected from publicly available databases and for each country, sub-region and region the ratios of country, sub-region and regional coastlines by ocean were estimated.

Data on overall country GDPs was obtained from World Bank Global GDP numbers for 2017.

ANNEX IV – SUPPLY CHAIN BEST PRACTICES IN THE OCEAN ECONOMY

EXAMPLES OF SUPPLY CHAIN BEST PRACTICES IN FISHERIES AND AQUACULTURE

Fisheries and Aquaculture - Some best practices

Procurement and Design

Installation of new fish farms

- Carrying out of detailed impact assessments around fish farms:
  - cataloguing possible endangered species where the operate is conducted
  - avoiding installation of new farms in protected areas
  - developing an informative document on the most common species found around the farms for technicians to create awareness on potential impact

Sustainable supplier selection

- Evaluation, audit and selection of suppliers based on sustainability criteria
- Favouring of suppliers with a strong ethical sourcing and with certifications such as Aquaculture Stewardship Council and Marine Stewardship Council

Monitoring system

- Establishment of a monitoring system to avoid depletion of scarce resources in the feeding process

Production & Capture (wild capture & aquaculture)

Sustainable Fishing

- Adherence to sustainable industry standards (e.g. Aquaculture Stewardship Council and Marine Stewardship Council) and certification of seafood produced
- Equipment of fishing vessels with "active fishing gear" in the form of ring nets and trawls (instead of bow nets) to minimize the risk of ghost fishing

Traceability

- Development of a company-wide traceability process, in collaboration with suppliers, to enhance supply chain transparency from breeding and feeding to the plate

Marine debris

- Creation of an internal marine debris working group to develop operational initiatives aimed at reducing marine debris at the source e.g. raising awareness among all employees, giving single farms individual ownership and accountability on the issue, reporting on microplastics in fish and collecting debris items in farms

Waste Management

Plastic use

- Definition of a policy on plastic use and plastic waste management including:
  - Reduction of plastic used in packaging and farming equipment
  - Reuse of farming equipment
  - Replacement of plastic by alternatives where relevant

Recycling of production waste

- Minimization of waste diversion to landfill by recycling all possible waste products, for example:
  - Transformation of mortality guts into by products (e.g. animal feed)
  - Transformation of sludge into soil improver

Biogas plant

- Conversion of waste products from fish farms into renewable energy and fertilizer through anaerobic digestion of biomass and conversion into biogas:
  - Carbon dioxide
  - Methane - used for renewable energy production
  - Di-gestate - used as fertilizer

The renewable energy produced, can also feed into the national grid

Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

EXAMPLES OF SUPPLY CHAIN BEST PRACTICES IN SHIPBUILDING AND REPAIR

Shipbuilding and Repair - Some best practices

Procurement and Design

Supplier engagement

- Introduction of returnable/ reusable containers in supplier shipments received
- Creation and distribution of a logistics manual to suppliers of parts and components, with best practices to minimize overpacking and use of non sustainable packaging material

Sustainable design

- During the design phase, investigation of solutions for the reduction of consumption at sea: reduction of boats' weight, design of hulls to improve buoyancy on water, optimization of the bonding systems for anti-fouling paint on the gelcoat, and introduction of environmentally-responsible equipment (solar panels, electric engines)
- Development of a tool to calculate and optimize the recyclability rate of boats produced

Life Cycle Assessment

- Carrying out of detailed lifecycle analysis for the different types of ships produced to determine their impact "cradle to grave" and identify the areas for progress to reduce their environmental footprint

Monitoring system

- Establishment of a monitoring system to avoid depletion of scarce resources in the feeding process

Operations & Logistics

Cleaner fuels

- Construction of ships fueled by cleaner fuels such as Liquid Natural Gas (LNG) as a preferred fuel
- Replacement and/or conversion of diesel-powered vessels to ships fueled by cleaner and alternative fuels such as LNG

LNG is considered the cleanest marine fuel available that, compared with heavy fuel oil, has significantly lower CO2 emissions and almost nonexistent particle emissions

Air and Water quality monitoring

- Periodic monitoring of air and water quality in areas surrounding the building site to identify environmental footprint of operations :
  - Tracking of PM sources as PM10, SO2, and NO2 to control air quality
  - Tracking of copper, zinc and other marine pollutants tracked to protect the marine ecosystem

Waste Management

Management of liquid effluents

- Compliance with regulation on purification and analysis of liquid effluents (by-products of industrial processes) before discharge into sea
- Improvement of real-time control of liquid effluents resulting from the careening of vessels and application to careening operations in order to minimize detection of deviations and accelerate corrections during the course of an operation

Recycling of production waste

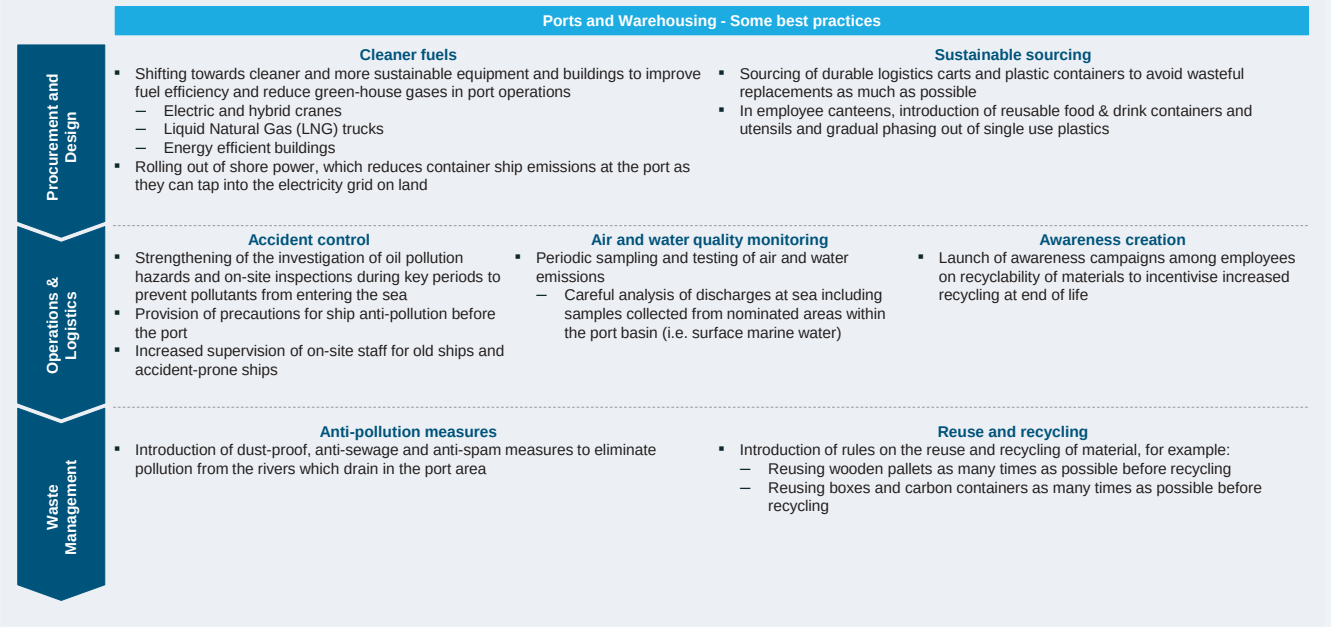
- Separation of scrap metals (aluminium, copper, iron, etc.) for reuse and recycling, through implementation of specific processes and creation of strategic partnerships with recycling players in the industry

Marine debris

- Continuous analysis and cleaning of waters surrounding the building site to detect and remove marine debris and microplastics to protect marine wildlife

Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

EXAMPLES OF SUPPLY CHAIN BEST PRACTICES IN PORTS AND WAREHOUSING



Source: Qualitative analysis of 69 ocean economy (fisheries and aquaculture, maritime transportation, ports and warehousing, shipbuilding and repair) and 36 non-ocean economy companies' sustainability reports

ABOUT THE ONE OCEAN FOUNDATION

This research is an initiative of the One Ocean Foundation, as part of its commitment to the diffusion of ocean literacy.

The mission of the Foundation is to accelerate solutions to ocean issues by inspiring international leaders, institutions, companies and people; promoting a sustainable blue economy and enhancing ocean knowledge through ocean literacy.

Thanks to a privileged network of contacts (companies, institutions, entrepreneurs, sportsmen, yacht clubs, influencers, etc.) the Foundation intends to develop a leading platform bringing together and strengthening the voices speaking out on behalf of the ocean around the world.

The distinctive feature of the One Ocean Foundation is its scientific scope and, at the same time, its strong educational drive, in order to increase awareness and establish constructive relationships between all stakeholders engaged in marine preservation at different levels.

Thanks to its partners, the One Ocean Foundation is engaged in numerous projects related to its mission of environmental protection, in particular: communication/educational activities especially for younger generations; scientific research; environmental projects.

One Ocean Foundation's projects are supported by Partners "Companies for Sustainability"

Find out more at www.1ocean.org/

Photo by Kurt Arrigo

All pictures are kindly provided by the photographer
Kurt Arrigo - https://kurtarrigo.com/

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